MEMBERS NEWSLETTER

September 2020—Q3

INCOSE

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President's Corner

Kerry Lunney
kerry.lunney@thalesgroup.com.au

How many times have you heard the word "unprecedented" over the last 6 months? Was it a few times, quite often, or every day as you watched the news channels? It has become a key word in our vocabulary. The intent behind its usage however primarily falls under 2 categories – those who are using it as an excuse to hide behind and those who are using it as an extraordinary opportunity to act and respond, perhaps in a manner not previously considered. Which one would we like to adopt for our discipline, Systems Engineering, for INCOSE, for our family, friends, and well-being?

It is quite likely both, but I would hope we would equate "unprecedented" to an "extraordinary opportunity." The road to recovery is going to be challenging for everyone and as systems engineers, systems researchers, system thinkers, and systems educators we have an important role to play in the community. Alliances will be formed between government agencies, industry, and academia to necessitate timely responses to build stimulus for our economies and our health and well-being. This in turn will provide greater opportunities for Systems Engineering. Consider what our predecessors did to rebuild after world wars, after earthquakes, tsunamis, and fires, and even after the 2008 global financial crisis. We can learn from these experiences yet apply new thinking, applications, models, and tools to our more complex systems of today and tomorrow.

The engineering community will be crucial to the road to recovery. Looking at the challenges going forward in Healthcare, it will not just be technical-medical solutions that humans will require. Rather our system solutions will now need to better address the sociotechnical element, the financial model, the social structures, and the sustainable operations of health giving, with COVID-19 having exposed the large gaps, disparities, and inconsistencies in many regions across the world. This is truly a systems problem to which we can assist and influence from policy makers to researchers, extending right down to the systems operating in the field.

Infrastructure projects are often the cornerstone programs for economic recovery. Investments may lean towards green infrastructure. As systems engineers we can provide our skills and expertise to address the solution options holistically and provide recommendations through trade-off studies across eco-design, sustainability, renewable energies, supply chain, life cycle costs, safety, meeting the needs of the customer and end user(s), just to name a few. Collaborations between systems engineers and energy engineers will be crucial for solutions to meet climate targets.

Investments in innovation and Research and Development (R&D) will also be required and we should strive to be part of this. If you know of a possibility, think what you can contribute as a systems engineer or researcher and make your case. It may be as simple as a "lack of awareness" on the recipient's side.

In each of these examples the sociotechnical aspect, sustainability, and resilience are becoming more and more fundamental in measuring the success of a system. If you are not familiar with these you should undertake an "awareness" course and learn from colleagues who are. This is just an example of the evolution of our breadth in systems engineering. The balance between the quality in people's work lives and technical performance excellence is important in engineering systems.

From INCOSE's perspective where can we make a difference? What should our focus be? The answer will be different for every one of us. I therefore urge each Working Group to

revisit their charter and plans for the coming year and look to adjust each when considering the “new normality” that is upon us. Ask “what are we addressing”, “is it still applicable”, “is there a new emerging problem to tackle”, “where best can we provide value”? Similarly, Chapters can look at local challenges that would benefit from Systems Engineering. Every member can examine recovery programs as opportunities to apply their Systems Engineering skills and expertise where previously the need may have not been evident.

Exposure to disruption can be extremely difficult and harsh in the short term. Whether you consider the COVID-19 crisis is a stress test or a catalyst for change, Systems Engineering will be needed to build resilient nations, to forge new collaborations, seek more innovative solutions, and shelter and repair our communities. Our vision is clear—a better world through a systems approach. Let’s go build this world in these unprecedented times!

Cheers,

Kerry Lunney

INCOSE President 2020-2021

INCOSE Human-Systems Integration Working Group | The Israeli Society for Systems Engineering | FlexTech | ESTIA | CentraleSupélec | BMGC

Save the Dates

HSI WG – IW2020

Tuesday-Thursday, 27-29.10.2020

International Workshop:

Human System Integration in the Era of Global Crises Challenges and Opportunities.

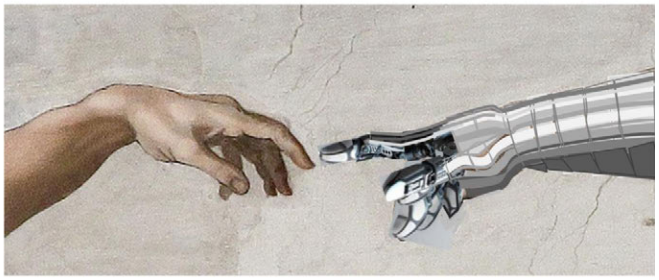
You are invited to take part in Developing and Advancing the HSI Awareness and Practices in the Systems Engineering Community.

Join us to reinforce the HSI community and inspire to persistent dialogue on HSI.

Virtual event for about 4 hours a day.

13:15 UTC/GMT on 27.10 and 13:55 UTC/GMT on 28, 29.10.

Free Registration. Pre-registration is required.
Details will be soon published.



HSI WG– IW2020

Message from the INCOSE President #7

Kerry Lunney, Kerry.Lunney@thalesgroup.com.au

Dear INCOSE Members,

Due to the uncertainties related to COVID-19-driven travel restrictions expected over the next four months, we have made the decision to move forward with the International Workshop, IW 2021, as a fully virtual event. This was a particularly hard decision to make as IW 2021 was our first-time planning to conduct the workshop outside the US, in the great location of Seville, Spain. However, we need to continue adapting our operations under the constraints imposed by the pandemic to provide our members with high quality INCOSE services, benefits, and opportunities. This is just another example of our resilience and evolution as a technical organization. The health and safety of our members, contractors and alliances continues to remain our highest priority.

You will receive details over the coming weeks through the various INCOSE news channels and on our IW website on how we will conduct the International Workshop (IW). Within the IW timeframe we still plan to hold an opening plenary, carry out the installation of the 2021 Board of Directors, run town halls as appropriate, and conduct a virtual "Working Group Market Place" at the conclusion. Yet now, under a virtual program, we have the added advantage of scheduling workshops for many groups and communities without the restriction of needing to allocate physical rooms. With this greater flexibility a group can leverage the virtual format for IW 2021 by having more than one meeting or could schedule a progressive workshop across various time zones, to name just a few possibilities.

To all our members and contributors to IW 2021, we understand the workshop is an important event to plan and progress the objectives of working groups and communities. Moving to a virtual program will continue to provide a strong collaborative environment to support the workshop, including greater outreach to participants. By building on the success of the International Symposium 2020 and our investment in its virtual platform, we are confident IW 2021 will also deliver the value our members expect from the International Workshop.

If you have any general questions relating to this message, please do not hesitate to contact us at helpdesk@incose.org

Lastly, I would like to again thank all our INCOSE volunteers and members who continue to contribute to the success and wellbeing of INCOSE. I wish the best to you and your families. And, I look forward to catching up with you at IW 2021, the virtual International Workshop.

Keep well, keep safe.

Kerry Lunney, INCOSE President

Notes from the Board

Lisa Hoverman, marcom@incose.org

The INCOSE Board of Directors (BoD) held their third quarter meeting remotely via Zoom considering the global quarantine status. The focus of this BoD meeting was :

- Sharing progress on our high priorities for 2020 and our functional areas,
- Review of the Budget and Planning Process for 2021,
- Updates from the INCOSE Value Streams,
- Updates on INCOSE IT Infrastructure and Collaboration Efforts,
- Updates from MARCOM, the Sectors, and Strategic Alliance Efforts,
- Updates from the International and Local CAB, review of CAB Needs and Fees,
- Update from the Academic Council and Policy Management Committee,
- News from our Nominations and Elections Committee,
- Lessons learned from a virtual International Symposium (IS) (check out the great recap in the following section);
- Celebrations for our 30th Anniversary, while quarantined, and
- Increasing value to members through online offerings – the INCOSE Virtual Community Offerings

2020 INCOSE International Symposium—Virtual: Takeaways from a First-Time Attendee

Justin C' de Baca,
INCOSE North Texas (NTX) President-elect

As systems engineers, we know a thing or two about risks and opportunities existing with regards to our systems of interests. With the COVID-19 pandemic developments, 2020 has brought many changes and difficulties to our lives. As such, communities have had to address the changes in the landscape and adapt to continue operation. Our organization is no different, moving the 2020 INCOSE International Symposium (IS) in South Africa from an in-person conference to a virtual one in a very short time span.

Members of the INCOSE BOD on a Zoom Call during the INCOSE Quarter Three Board Meetings

I recently received a scholarship to attend this year's INCOSE IS (my first) and can confidently say it was very well-thought out and implemented in the virtual format. Being part of a generation continually seeing a vast movement into the digital realms, I was able to fully appreciate the content, presenters, and dialogue availability.

Even scaled down to three days, there was a lot of content for attendees to go through. The virtual platform made everything available to the viewers at home. From a schedule, you could easily click on a session and access the paper from the authors. When the scheduled time arrived, you would view a live or pre-recorded presentation. The track chair asked the presenters questions typed into the Q&A chat during the Q&A sections, allowing coverage of more questions. An hour after delivery, the presentation recordings and presentation file would release on the platform, allowing you to either re-watch sessions or see sessions you missed. Best part of all, even after a session's scheduled time, attendees could pose questions to presenters at any time during the conference, where both presenters and attendees could read them, and get a response! I was able to realistically attend/view every session and ask any questions I felt the video Q&A did not cover or the session chat already asked (and observe several questions I had not even considered). The attendees also could attend scheduled "cafes" after each day's sessions, allowing us to further discuss any topic with the presenters and the community, which was a fantastic opportunity for dialogue and interaction.

Overall, the 2020 INCOSE IS shows great promise for the virtual conference prospect and with the current trends, I think it would be an excellent model for other prospective conferences to reference for their own deliveries. Bravo INCOSE and thank you!

Gerrit Muller, INCOSE Fellow, Recognised as a USN "Meritorious Teacher"

Prof. Gerrit Muller of the University of South-Eastern Norway (USN) is one of the first group of Meritorious Teachers. He was the only member of the member of the USN Technology, Science and Maritime Sciences faculty to receive this recognition.

This award recognises teachers:

for their contributions to enhance the quality of teaching and enhance the learning of our students."

Updates from the Board

Contributions from the Board

Updates from the Board —Asia Oceania

Serge Landry
serge.landry@incose.org

Sector Organization

To deal with its increasing diversity, INCOSE organizes into 3 geographic sectors: Americas, EMEA (Europe, Africa, and Western Asia), and Asia-Oceania. Refer to SEC-100 policy for details.

The Asia Oceania Sector is the newest, smallest, and fastest growing sector in membership terms. It houses over 1200 individual members organized in 9 chapters from Australia, China, India, Japan, Korea, New Zealand (emerging), and Singapore

As the Asia Oceania Sector Director, my role is serving the sector's chapters, aspiring chapters, and members at large to help them be successful. Given the geographic distribution, languages and cultures, and varied needs, it is no simple task. To help me succeed in this endeavor, I rely on matrix organization involving the following volunteers:

- the sector directors team comprising the three sector director working together for mutual benefits
- the dedicated sector chapter leaders
- the outstanding board of directors members, driving different aligned agenda and teams
- a sector dedicated leadership volunteer set:
  - Assistant Director: Dr Ramakrishnan Raman
  - Academic Matters: Dr Lee Le Fei
  - EWLSE: Stueti Gupta
  - Nomination & Election committee: Stueti Gupta
  - Outreach Ambassador: Robert Ong

Helping Struggling/Inactive chapters

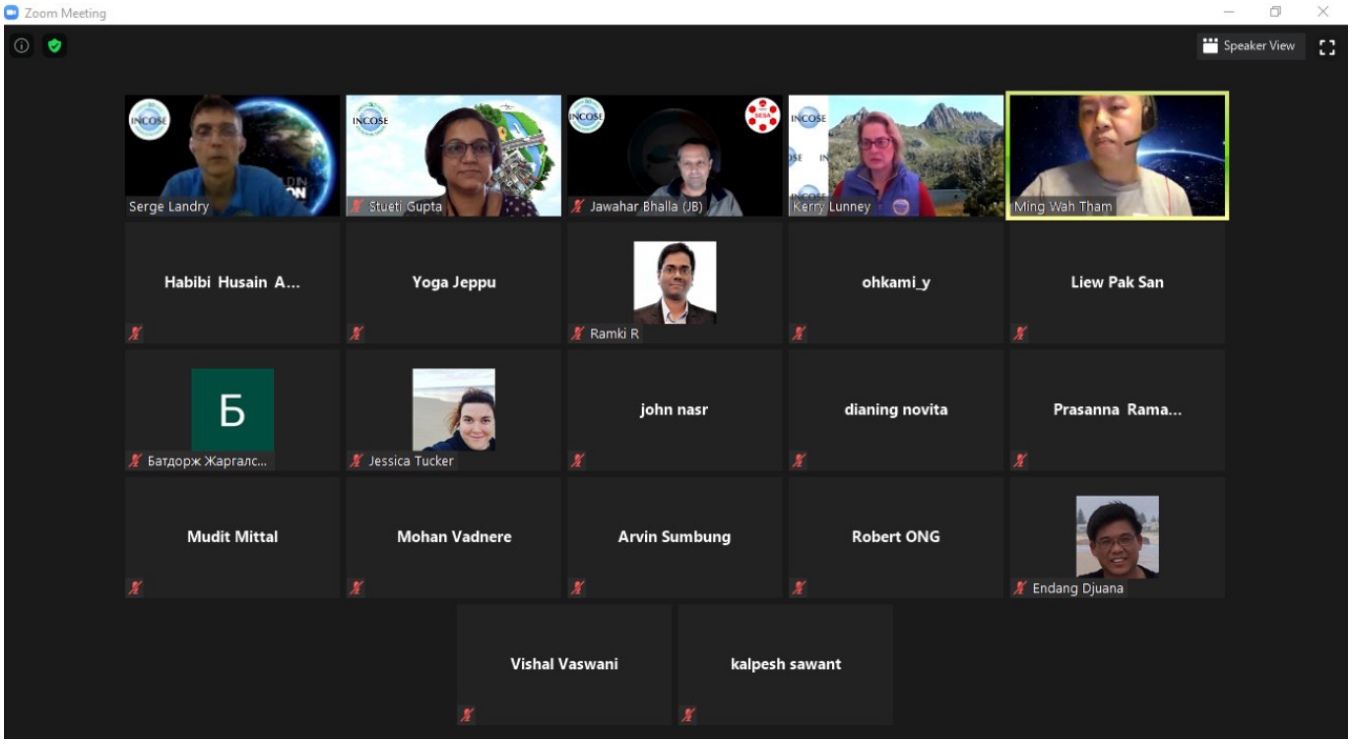
As chosen by the board of directors, this is the main sector priority for 2020—***Engage with struggling/inactive chapters and work proactively to help them get on their feet, or failing that, merge the chapter with another local chapter.***

The sector has engaged dialogues towards chapters with low or no activities to determine how we can help.

Despite the Covid-19 outbreak delaying initial plans, we strive to be in a position to recommend two action types by year's end:

- restart chapter recurrent activities for chapter member benefit
- consider chapter retirement—a dire consequence but can benefit members as they will have the ability to participate in an active chapter

This important activity is on-going.



Chapter Collaboration

To bring the chapter experience to more members, and with the effective INCOSE board of directors help, we leveraged more modern collaboration technologies and better shared event calendars dissemination.

Thanks to our virtual zoom events, we encourage chapters holding events to 'invite the entire sector and beyond' and have had, as a result, some widely attended chapter led activities.

Two INCOSE Technical Leadership Institute members (one from Japan and one from Singapore) have triggered a Japan symposium idea and organization with participation from regional and international speakers. This event is now a virtual meeting in September due to the pandemic.

Certification Status. Certification is a strong sector interest.

Upcoming Sector Events. Look out for the following upcoming events 2020-2021:

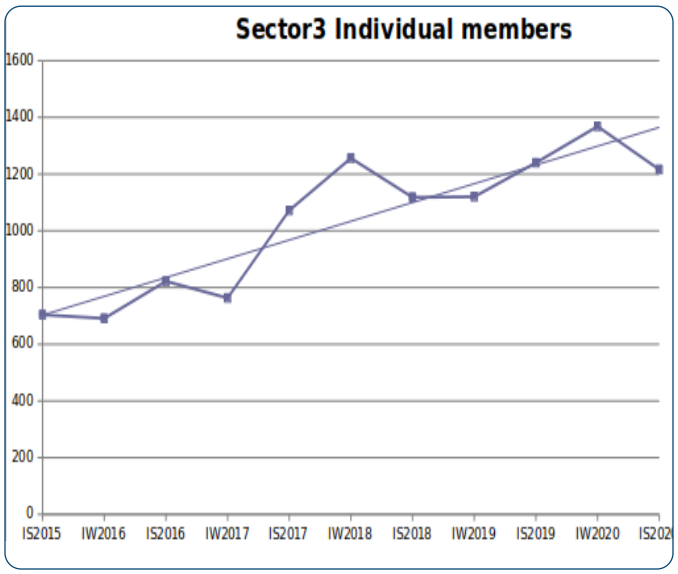
- Japan Symposium, 2-3 Sep 2020
- ASEW—Australian Systems Engineering Workshop 2020, 25-27 Oct 2020
- Bi-weekly India webinar series
- CSD&M Asia in China, 12-13 Apr 2021

Individual membership trends:

Despite this year reducing members since the pandemic's beginning, the long term trend remains positive.

Aspiring Chapters

In the past few years, there has been on-going discussions with a few countries regarding starting chapters, particularly Indonesia, Mongolia, New Zealand, and Thailand. New Zealand with the Australia chapter's help has managed to achieve emerging status.



IT: INCOSE Rolls out Zoom

Bill Chown, INCOSE CIO, cio@incose.org

Following the International Symposium's success, subsequent Strategy Sessions, and numerous other meetings, all using the INCOSE Zoom resources, we are now promoting Zoom as our preferred online meeting solution.

Zoom provides a way to hold virtual meetings, present webinars, share information, or just chat.

Why select Zoom?

The Zoom package is far more cost-effective than our previous offerings, and so we will realize significant cost savings as usage moves to Zoom. We are also seeing significantly better quality and user experience with Zoom.

There is no cost allocation to Chapters or Working Groups for using our collaboration services.

WebEx and GlobalMeet accounts will still be available, but more limited in quantity, and we encourage all users to migrate to Zoom for all your future needs.

More Details

INCOSE has numerous Zoom accounts available for Chapters, Working Groups, and Committees to use. We have assigned some Zoom accounts to specific leadership roles, or to particular uses such as the popular Systems Exchange Cafés held every two weeks.

Further Zoom accounts belong to the Sectors for regional and Chapter use, Technical Operations for Working Groups, and other areas such as Services and Special Projects. Those accounts are shared resources, and we have guidance about how to use a shared Zoom account available online in Connect, under the Help menu in the FAQ section.

INCOSE Zoom accounts can support up to 300 participants in a meeting, or 100 for a Webinar. We also have larger Webinar accounts available and can enable additional resources as required.

Zoom offers very effective Voice over IP (VOIP) and we strongly recommend its usage to all participants. If you absolutely do not have a good headphones' set, nor access to the computer microphone and speakers, then dial in options are also available.

How do I request a Zoom account use?

Zoom accounts are available to any Chapter. To access your area's available Zoom accounts, contact your Sector Director who can assign account access for your purposes.

For Working Groups contact the Technical Director and they can assign account access for your purposes.

For other needs, contact the CIO, cio@incose.org, who can find you accounts appropriate to your needs.

What do I need on my end to use Zoom?

Zoom can run from any web browser, such as Chrome or Safari, by going to incose-org.zoom.us, or just following the link an organizer sends out for a meeting.

You can optionally also download the Zoom desktop App, which gives a slightly better user experience for a participant and is significantly more effective for a meeting organizer, or Host.

If your environment does not allow you to download the App, the web browser experience can also work perfectly well for most users.

We strongly recommend you get a good headset, with microphone and earphones, and a web camera. Those built into a laptop can be adequate, but fan noise, limited image quality, and poor sound with background noises are typical unsatisfactory setup indicators.

How can I get help with using Zoom or getting a meeting set up?

See our further information on Connect at https://connect.incose.org/help/INCOSE%20Web%20Support%20Wiki/Zoom%20FAQ.aspx

For the Future

INCOSE continues to look at additional collaboration tools, and we plan to make Microsoft Teams a more significant collaboration platform part, to complement the current SharePoint-based Connect. Coming this year.

If you know additional tools you find useful in your activities and would like INCOSE to consider adopting, then we would like to know more about your experiences. Please contact cio@incose.org.

Warm Greetings from President-Elect, Marilee Wheaton

marilee.j.wheaton@aero.org

I joined INCOSE as a member in 2002, the year I returned to The Aerospace Corporation joining our Systems Engineering Division after spending several years at TRW Systems. I had colleagues at Aerospace who had been members and leaders since INCOSE's inception thirty years ago so knew the organization well. One of my Aerospace friends and colleagues was the 1997 International Symposium (IS) chair when it was in Los Angeles, and I clearly remember attending the amazing event. Currently I am a Systems Engineering Fellow at Aerospace, where I have focused on model-based systems engineering (MBSE), enterprise systems engineering and digital engineering, building corporate capability, and supporting our government customers. I am proud to be an INCOSE Fellow for contributions as a practitioner and to engineering education and in 2018 received an INCOSE Outstanding Service Award. I am also an American Institute of Aeronautics and Astronautics (AIAA) Fellow, given my career in the national security space domain, and a life member and Fellow of the Society of Women Engineers (SWE) where I have encouraged STEM careers.

Fast forward 18 years from joining INCOSE to January 2020 (pre-pandemic) and I am the INCOSE President-Elect at the International Workshop (IW) in Torrance. It became very clear immediately at the first board meeting I attended. Even though I had been an INCOSE member for almost two decades and attended many IW and IS events, being on the board was an entirely different experience. Do you know how much volunteer time the INCOSE Board members invest for the member's and the broader systems engineering community's benefit? For many positions, it is a minimum of ten to twenty hours per week!

Since it is my first year on the Board of Directors, my highest priority is endeavoring to learn as quickly as I can about INCOSE operations. There are several committees reporting to the President-Elect including Nominations & Elections (N&E), Policy Management Committee (PMC), and Special Projects. The N&E Committee just finished their work this year identifying and nominating a fully contested slate of well qualified candidates providing members with a true choice of leaders, please remember to vote! The Special Projects activities include the Systems Engineering 2035 Vision, Future of Systems Engineering (FuSE) Initiative, Grand Challenges, United Nations' Sustainable Development Goals, and Water & Sanitation for the Urban Poor (WSUP). All these special projects will further progress INCOSE's "better world through a systems approach" vision. We are still looking for our Grand Challenges Special Project lead to spearhead and focus what INCOSE should do next in this critical global need. Please let me know if you have an interest.

There are two other high priority areas for me. The first is continuing to recognize all the INCOSE leaders who invest their time to provide benefits for not just our membership, but the entire systems engineering community; and identifying other innovative ways of showing our sincere gratitude. Please let me know if you have some ideas to share for innovative recognition methods for our member's and volunteer leader's contributions! The other priority is the INCOSE Academic Council's, led by Dr. Bob Swarz, key role. We need to continue attracting researchers to our community to increase our innovation's value and enhance our Systems Engineering Journal prestige, and nurture a systems engineering professional pipeline through academic program support. My emphasis in the academic program importance stems from past technical leadership and current Conference for Systems Engineering Research (CSERs) and as a previous USC Systems Architecting and Engineering (SAE) program instructor. For those interested, CSER2020 will be all virtual and held 8-10 October. Please check out the conference website www.cser2020.org.

I look forward to continually sharing the camaraderie at our virtual events, and sincerely look forward to when we can all see each other in person. In the meantime, my sincere hope is we all stay safe and stay healthy in our truly global community.

Updates from the INCOSE BOD Strategic Integration Director

Tom McDermott
thomas.mcdermott@incose.org

On 3-4 August over 70 INCOSE members gathered in virtual space to support our first ever virtual INCOSE Strategy Sessions. These are normally a one-day event the Fridays preceding the annual International Workshop (IW) and International Symposium (IS) events. The goal with these strategy sessions is capturing ideas and needs into a strategic framework to drive real change in an open and transparent fashion. Each session produces a data set and recommendations then presented to the board of directors for approval to proceed, priority setting, resourcing, and other area impacts to. Quarterly board meetings track recommendations generating board actions. The Strategic Integration Director maintains a strategy session recommendations and dispositions list board meetings continuously review until they work or otherwise close all items. In this way the event lives on and your inputs receive consideration in ways driving real improvements to our member value.

Connect has a link to the strategy session topics and results . Select the "Strategy Sessions" icon to the far right of the document libraries section. There you will find a folder for IS2020 Virtual Strategy Sessions including a short welcome video, a short summary results video, and the session artifacts. The virtual IS2020 Strategy Sessions considered four topics as summarized below. Thank you to all who participated in the sessions, facilitated a session, and flawlessly maintained our virtual connectivity (especially our CIO Bill Chown who was there at 3am his time to serve as our Zoom host for all sessions).

Erika Palmer and Tom McDermott co-chaired the first session, "Building the INCOSE Grand Challenges Program." INCOSE has had several initiatives, workshops, strategy sessions, and Working Group themes focused on grand challenges, though grand challenge efforts have thus far been inconsistent at INCOSE or have lost momentum after IW/IS sessions. This strategy session explored how to focus INCOSE's grand challenge strategy and how

Strategy Sessions

to develop a formal organizational structure for grand challenges—an INCOSE Grand Challenges Program. The groups broke up into "what groups" (discussed the INCOSE Grand Challenges Program vision and strategy) and "how groups" (discussed the future program's organization and management). Several key outcomes from these rich discussions include (1) appointing grand challenges assistant director under strategic integration to maintain momentum, (2) decentralizing management with bottom-up approaches through chapter involvement, (3) establishing partnerships with non-governmental organizations where INCOSE has an contribution to a grand challenge rather than its own specific grand challenge, (4) promoting academic research transitioning into practical use, (5) having an INCOSE specific ambitious grand challenge, such as "Building Trust in Complex Systems using Autonomy and AI to Evolve."

The whole professional development portal core development team supported the second session, "Creating the Professional Development Portal (PDP) User Journey.". Thanks go to Kirk Michaelson, who organized the event, and Molly Kovaka who created an on-line SmartSheet application to collect and affinitize PDP User journey value statements. To better serve our existing members and drive new interest among other professionals wanting to enhance their systems engineering skills, INCOSE is developing the PDP. For the PDP to be successful, the specific user's journey through the portal needs to provide everyone value. This strategy session's goals were to collect data from the breakout team members

to verify data already collected by the PDP team on user value, ensuring we have not missed anything (fresh set of eyes), and to prioritize the user experience data collected. The session collected 647 total responses. Some provided likes and dislikes from other similar websites associated with other professional society's professional development. Many responses were specific user value and user experience inputs and associated prioritization, across the experienced systems engineers and our CAB partners. Additional collected responses targeted non-member PDP use (ideally attracting new INCOSE members), special values and experiences for novice systems engineers, and current member pain points. We thank all who participated in this session as it created information to successfully drive the PDP project forward.

Nicole Hutchison, Courtney Wright, and Kerry Lunney facilitated the third session, "Life in INCOSE after COVID-19." COVID-19's advent has rapidly changed the way we live our lives, do business, and collaborate. INCOSE has pivoted many typical activities to accommodate a socially distanced world. At the strategy session we reviewed the changes INCOSE has made to date and gathered feedback and recommendations on these new activities, the challenges remaining, and how INCOSE should move forward when we can enjoy in-person activities again. Specifically, the session focused on the most strongly impacted value sections: membership, certification, and events. There were many specific recommendations during the session, but the key recommendations included continuing many activities or services, started as a response to COVID, going forward. For example, the digital infrastructure to support meetings, collaboration, and events is an improvement over the options previously available and should remain. In fact, there was a specific recommendation to create a new value stream specifically around this infrastructure. Likewise, there was strong support to continue with accommodations like self-study options to earn professional development units and virtual options for attending events in-person events ("hybrid" events). The strategy session team is writing a detailed recommendation summary to move forward.

Marilee Wheaton, Ray Madachy, and Sara Sheard led the final session, "Joining Together Systems and Software Engineering." Several key initiatives such as AI4SE (and SE4AI), digital engineering, and MBSE are also in the technical software engineering and computer science domain. The group explored in this strategy session how joining forces with the software engineering profession and their perspectives strengthen INCOSE objectives. Some ideas include a common conceptual framework linking our two fields, making systems engineering language more inviting to software professionals, focusing on continuous integration, and leadership initiatives. The group recommended stronger engagement with professional societies like the IEEE Computer Society, the Association for Computing Machinery (ACM), the International Society of Software Engineering (ISSE), and others. Other recommendations included a focus on better alignment with continuous integration and delivery practices, joint competency development around an emerging area like AI and machine learning, partnering on a systems engineering stream at a software conference or workshop, and reflecting on adjusting INCOSE practices and language to attract more software members.

14th Annual INCOSE Great Lakes Regional Conference (GLRC)

11-14 April 2021 – Detroit, Michigan, USA

"Mobility Systems – Land, Sea, Air and Space"

Rescheduled from Sept. 13-16, 2020 to April 11-14, 2021 due to COVID-19. Provisions for presenting virtually are planned.

Call for Submissions

ABOUT INCOSE GLRC

The INCOSE Great Lakes Regional Conference (GLRC) is a medium-sized annual INCOSE systems engineering (SE) event organized by the INCOSE Chapters of the INCOSE Americas Sector North (Great Lakes) Region.

The GLRC was established in 2007 to provide a forum for supporting and promoting INCOSE and SE at the local Chapter and Regional levels.

The GLRC is strategically positioned "in-between" INCOSE's smaller-sized chapter-level events and INCOSE's two large-sized international events – the Annual INCOSE International Symposium (IS), held in July, and the INCOSE Annual International Workshop (IW), held in January.

The GLRC strives to deliver an exceptional high-value conference experience to attendees and presenters alike. Our approach is to provide an outstanding peer-reviewed program at a remarkably affordable price, with significantly less time commitment and travel expense than the INCOSE IS and IW events.

Website www.incose.org/GLRC

v2–07/18/2020

TOPICS / SUBMISSION TYPES

Abstract submissions of the 4 types listed below are sought. Theme-relevant topics relating to ***all aspect of SE***, and from ***all sectors*** of industry, education and government are desired.

(1) ***Presentations and Panel Sessions*** (24-30 sought) for the 2-day, 3-track "core" GLRC program; Mon/Tues April 12-13.

(2) ***Presentations and Lectures*** (6-8 sought) for the INCOSE Systems Engineering Professional Development Day (SE-PDD) program, Tues April 13, to be live-streamed to INCOSE CAB, University, INCOSE Chapter and industry locations world-wide.

(3) ***Feature Presentations*** (3-5 sought) supporting the GLRC keynote and technical talk slots Mon-Tues April 12-13.

(4) ***Tutorials and Workshops*** (6-10 sought) for slots on Sun April 11 and/or Wed April 14.

PRESENTER BENEFITS

The GLRC appreciates that it is the presenters, panelists, and instructors who make the GLRC (and the advancement of INCOSE and SE!) possible. Please consider the benefits that the 14th Annual INCOSE GLRC is able to provide:

(1) ***Discount admission*** (est. 20-40%) to the GLRC and its activities. ***Free*** admission may apply in certain cases.

(2) ***Copyright ownership*** – GLRC uses INCOSE's standard IP contract. Unlike many other conferences, you retain ownership of your work.

(3) ***Broadened exposure*** due to GLRC/INCOSE affiliations with other organizations (e.g., PMI, ASME, IEEE, SAE, AIAA, etc.), and Live-streaming.

(4) ***Five minutes or less*** to initiate your submission on-line using EasyChair. *

Key Dates

Deadline for Submissions *	Nov. 30, 2020
Notification of Acceptance	Jan. 11, 2021
Draft Presentation Due	Feb. 8, 2021
Final Presentation Due	March 8, 2021
Conference Dates	April 11-14, 2021

Contact INCOSE GLRC14 Submissions Coordinator Dr. Robert Bordley at rbordley@umich.edu

INITIATE ABSTRACT SUBMISSION

** Please **INITIATE** your submission ASAP, however, **no later than the Nov. 30th deadline**. EasyChair Premium Service allows you to log back in AT YOUR CONVENIENCE to update, edit, and complete your final submission.*

www.easychair.org/conferences/?conf=glrc14

Sector Updates—Americas

INCOSE-LA Report, August 14, 2020

Phyllis Marbach
prmarbach@gmail.com

INCOSE-LA proudly hosted 90 attendees over Skype for our 11 August speaker meeting. The Aerospace Corporation's Julie White presented "Test Like You Fly." Charts are available from our Library here. A workshop to learn the techniques described during the speaker meeting will be Monday 17 August and Tuesday 18 August. Another event held 8 August was the Chapter Strategic Planning Meeting (SPM) conducted over Zoom. Most board members attended, provided director reports, and discussed planning for 2020's upcoming major events.

14 July, the LA Chapter hosted a virtual speaker meeting with Keith Smith from University of the Pacific presenting "On Effective Presentations." We learned text should be no smaller than 18-point font and 32-point is even better. Your presentation should tell a story to be memorable. Minimize the bullets on each chart to no more than three and the words at each bullet to no more than eight. Otherwise the audience will read your chart and not listen to your words. Charts are available at the LA Chapter Library link provided above. Many chapter members attended the first virtual International Symposium the following week. To attend live meant starting at 1 a.m. and going until about 11 a.m. if you attended the Cafés following the tracks.

Danny Polidi, from Colorado State University, presented "Cost Modeling as it Pertains to System Engineering" on 9 June 2020. Mr. Polidi presented a cost sensitivity algorithm of the various system components determining which subsystem components in a chosen design solution have the highest cost sensitivity. The algorithm highlights the areas a system designer could reduce the overall system cost early in the program life cycle. These charts are also available in the LA Chapter Library.

INCOSE-LA is actively working on conference committees for two 2020 conferences. The Conference on Systems Engineering Research (CSER), postponed to 8-10 October 2020, where systems engineers from around the world will meet virtually to present their research in systems engineering. This 18th CSER focuses on exploring recent trends and advances in model-based systems engineering (MBSE) and MBSE synergy with simulation technology and digital engineering. Learn more about it and register to attend CSER 2020 at our website: www.cser2020.org

The Western States Regional Conference 2020 will be virtual as well on 17-19 September. We have finalized the technical program and registration is open until and during the conference. Come celebrate successful systems engineering applications from the Puget Sound area and Western United States and identify future potentially valuable activities. Please see our website here for more information: www.incose.org/wsrc2020.

Virtual Meetings in the Colorado Front Range

Renee Steinwand, rlsteinwand@gmail.com

The Colorado Front Range Chapter has struggled with geographic dispersity contributing to difficulty getting members to attend in person from Fort Collins, Boulder, Denver, Colorado Springs, and Pueblo. A 180 miles total distance, taking anywhere from 3-6 hours to travel by automobile. During rush hour through Denver, it can take a several hours to travel through the city.

Virtual Meetings
The Shutdown Bright Side

During the pandemic, Angie Rush, Colorado Front Range technical director, has made an impactful effort to find presenters willing to remotely deliver to our chapter members. When INCOSE provided the chapter Zoom accounts, we felt this was a great opportunity to reconnect with our members and provide quality presentations on interesting topics.

During the last few months, we transitioned from using GlobalMeet to Zoom. In March, we planned to host Chris Schreiber, INCOSE Digital Engineering Exchange Working Group

(DEIXWG) co-chair, speaking on Future MBSE and SysML Directions. The Monday before the presentation, the Colorado Governor directed everyone to work from home and stay home. We directed our members to call in to listen to the speaker and use the website for the presentation.

In May, Angie scheduled Dr. Larry Strawser to provide an INCOSE Future of Systems Engineering (FuSE) overview, including its origins, charter, planned outcomes, a FuSE project summary (chartered, proposed, and gaps), and the relationship between the Systems Engineering Vision 2035 and FuSE. Again, we used GlobalMeet for the presentation. About a week after the presentation, Tony Williams, America's sector director, sent out Zoom account information for chapters as an alternative meeting platform.

In June, we set up our first Zoom meeting to host Dr. Michael D. Watson from the National Aeronautics and Space Administration (NASA) Marshall Space Flight Center (MSFC) System Engineering Management Office. His addressed "Engineering Elegant Systems: Theory and Practice of Systems Engineering."

In July, we hosted Zane Scott, discussing "There is No Such Thing as Non-Model based Systems Engineering"—Models are all communication and thinking's basis. However, we had to postpone the meeting, because the Zoom host could not attend and there was not a backup host (lesson learned).

In August, we hosted Dr. Aleksandra Markina-Khusid from The MITRE Corp. She will discuss the digital engineering toolchain.

It seems we have solved the kinks and gained momentum by hosting speakers on the third Wednesday of the month, scheduling regular Zoom meetings, sending emails to the chapter, and updating the website in a timelier manner.

We hope to continue to connect with our members using Zoom for our speakers. Maybe when things relax, we can start exploring how to have our meetings in multiple locations so members can meet in person. But for now, it is much better than it was pre-pandemic.

INCOSE Chicagoland Chapter 10-Year Anniversary

Bob Parro,
bparro@rivernorthsolutions.com

In mid-2008, a Chicago area medical device industry systems engineer's layoff triggered an initiative gathering systems engineers and companies practicing systems engineering together to establish a community network benefiting the participants. From the first humble September 2008 meeting comprising about 25 people and much uncertainty about the direction forward, to the first year piggy backing the Finger Lakes Chapter meetings, the Chicago Chapter has grown to approximately 150 members and several meeting locations spread between two states. It offers year round monthly meetings (webcast globally the third Thursday of the month at 6:30pm CST, https://incose.pgimeet.com/INCOSEResourceTwelve), plus third and second quarter all-day seminars, mid-year outings, periodic annual INCOSE Great Lakes Regional Conference (GLRC) hosting, and even hosting the 2010 INCOSE International Symposium. Our monthly meeting video recordings, back through 2013, remain available to members in an online archive here.

Chapter leadership has steadily improved and expanded member value over time as evidenced by a bronze, a silver, six gold, and two platinum Circle Awards over the 10-year Chapter life. Those interested can view the ten chapter presidents here. We have had the

INCOSE

2010 10 2020
CHICAGOLAND

Happy Anniversary

honor of having one INCOSE founding member be part of the chapter for over 9 years. Randy Iliff heavily contributed to member value both at local and international levels giving many presentations, webinars, and seminars. He also served on the chapter board for many years where he provided wise guidance coming with his 35+ years systems engineering experience. Recently Randy moved from Madison, WI to Prescott, AZ.

Early in 2020, the chapter proudly supported starting an INCOSE student division at the University of Illinois at Urbana-Champaign Grainger College of Engineering.

An exciting initiative getting underway in the chapter is establishing a Corporate Liaison Program cultivating industry relationships through podcasts. Chapter leadership will interview corporate leadership (CIOs and CTOs) about relevant, current hot topics from the members' viewpoint. This initiative includes the chapter developing close ties with one domestic and one international chapter to co-promote each other's activities and initiatives. Interested chapters please send an email to the article author with subject "Corporate Liaison Initiative."

The Chapter would not be the success it is without the generous and consistent sponsorship of local companies, particularly IBM's facility and financial support, and also BB7's meeting location facility support in Madison, WI and Oshkosh Corp. in Oshkosh, WI. The Chapter eagerly awaits holding in-person meetings and seminars at our new partner's, Aerotek and EASI Engineering Services, Schaumburg, IL office.

2021 Annual INCOSE international workshop

join us for the first virtual

Annual INCOSE International Workshop

29 - 31 January 2021

www.incose.org/iw2021

2020 KEY NUMBERS

170
Meetings

618h
of Productive Workshop

13h
of Social Events

Next regional events

Don't miss an opportunity to join one of the regional conferences

SEPT

- **INCOSE Japan Symposium 2020 Virtual Event - hosted by JCOSE**
  02 - 03 September 2020
  Japan
  www.js2020.online/

- **2020 Annual INCOSE Western States Regional Conference (WSRC) - Now Virtual!**
  17 - 19 September 2020
  United States
  www.incose.org/wsrc2020

- **INCOSE Brasil Virtual Conference 2020**
  28 - 29 September 2020
  Brasil
  incose.com.br/conference/

OCT

- **CSER 2020 - Conference on Systems Engineering Research**
  08 - 11 October 2020
  United States
  cser2020.org

- **2nd Annual INCOSE New England Fall Workshop**
  15 - 17 October 2020
  United States
  www.neincose.org/incose-ne-fall-workshop-2020

- **HSI 2020 Workshop**
  27 - 29 October 2020
  Israel

APR

- **14th Annual INCOSE Great Lakes Regional Conference (GLRC14)**
  11 - 14 April 2021
  Detroit, United States
  www.incose.org/glrc

Sector Updates—Asia-Oceania

India Chapter Updates

Stueti Gupta
stueti.gupta@gmail.com

To mark the tenth anniversary, the INCOSE India Program Committee launched a webinar series for learning and networking among systems engineering professionals. They have organized ten webinars all well attended by both industry professionals and academia with very engaging discussions. These Webinar recordings are available in INCOSE YouTube Channel—INCOSE India playlist here:

- **Evolving Systems Engineers to Meet Tomorrow's Changing Needs**
  - Serge Landry, Director, INCOSE Asia Oceania Sector
- **The Story of the INCOSE Telescope Challenge Team and the OpenSE Cookbook**
  - Robert Karban, Lead, Systems Environment, Jet Propulsion Lab, NASA
- **Who is an Effective Systems Engineer?**
  - Dr. Devanandham Henry, Systems Engineering Head, General Aeronautics, Bangladore
- **Resiliency in Systems Engineering**
  - Rick Hefner, Ph.D, Program Director, California Institute of Technology
- **PHM, Systems Engineering, and Standards**
  - Ravi Rajamani, PhD., FSAE, FIMechE
- **Developing Safety Critical Systems**
  - Dr. Yogananda Jeppu, System Engineering Principal, Honeywell Technology Solutions and Adjunct Faculty, Manipal University
- **Functional Safety—Automotive Avionic Systems**
  - Reveendra Menon, CSEP, Principal Member, Technical Staff, SENZOPT Technologies PVT LTD, Bangladore
- **Systematic vs. Systemic—What's the Difference?**
  - Jawahar Bhalla (JB), Principal, JB Engineering Systems and Technical Director, Systems Engineering Society of Australia (SESA)
- **A Model Centric Framework and Approach for Complex Systems Policy**
  - Shamsnaz Virani Bhada, Ph.D, Assistant Professor in Systems Engineering, Worcester Polytechnic Institute
- **Machine Learning models for aiding System Architecture Design Decisions**
  - Dr. Ramakrishnan Raman, ESEP, Principal Systems Engineer—Honeywell, and Assistant Director—INCOSE Asia Oceania Sector

If you would like to connect with the INCOSE India Chapter, please email the chapter at IncoseIndiaChapter@gmail.com. You can follow the chapter activities on LinkedIn (https://www.linkedin.com/groups/2876451/) and Twitter (https://twitter.com/INCOSE_India).

FYI Information and Tools for Now

Leading Indicators Webinar Showcase

After a break for the INCOSE International Symposium, the webinar showcase returns with "Leading Indicators for Systems Engineering Effectiveness" from 2010.

A leading indicator is a measure evaluating the how effectively a specific activity applies to a project in a manner providing information about impacts likely affecting the system performance objectives. Leading indicators support effective systems engineering management by providing expected project performance and potential future state visibility. The webinar examined the background and motivations for developing the indicators, the guiding principles, and the indicator's validation and usage.

Please watch the webinar on the INCOSE YouTube channel, and raise any questions/discussion points on the INCOSE LinkedIn discussion thread. Lastly, watch our Webinar Showcase page for upcoming webinars and related Q&A sessions.

Sector Updates—EMEA

France Chapter
AFIS—Vision 2030

Mickael Bouyaud, technicaldirectorate@afis.fr, and Jean-Luc Garnier, president@afis.fr

In June, AFIS released the first leaflet regarding a Political, Economic, Social, Technical, Environment, and Legal (PESTEL) vision for 2030 and later. This leaflet is currently located on INCOSE Connect, in French. This document will have an English translation before end of 2020.

AFIS works to extend this vision with additional sections describing Strengths, Weaknesses, Opportunities, and Threats (SWOT) of Business Domains and Systems Engineering regarding necessary product, service, and system evolutions to target the 2030+ needs.

Discipline opportunities and challenges, analysed here already anticipate concerns systems engineering can solve if it prepares, adapts, and extends itself. Hence, the study paves the way for the AFIS strategy and ensures its decisions coherency towards its stakeholders, members, and partners.

As the AFIS vision and the INCOSE Future of Systems Engineering (FuSE) develop towards similar objectives, the coming INCOSE events need to hold some joint discussions and presentations to get outcome consistency.

INCOSE UK Updates

INCOSE UK Secretariat,
publications@incoseuk.org

ASEC 2020 Goes Virtual

It is our pleasure to announce ASEC 2020 is going virtual.

Scheduled to run from 16 to 17 November, this virtual event will feature the main presentation stream and a Sponsor Showcase environment.

The theme for this year's conference is: ***"The Challenges of contemporary Systems Engineering"***

The main presentation stream will feature the usual high level technical presentations on contemporary systems engineering theory and practice, whilst the Sponsor Showcase environment will give attendees access to event sponsors.

More details will release soon, so please keep an eye on asec2020.org.uk for further updates.

Professional Registration Online Sessions

In February 2020, INCOSE UK Ltd. received approval to become an Engineering Council licensed member (having previously held professional affiliate status), and therefore the Engineering Council licenses INCOSE UK Ltd. to assess candidates for national professional engineers and technicians register inclusion as Chartered Engineer (CEng), Incorporated Engineer (IEng) or Engineering Technician (EngTech).

If you want to gain professional registration, and are an INCOSE UK member, now is a great time to apply. INCOSE UK offers members a route to professional registration for systems engineers, accepting both new applications and transfers from other licensed institutes.

Our interactive professional registration online sessions are the perfect way to start your journey to Chartered Engineer (CEng), Incorporated Engineer (IEng) or Engineering Technician (EngTech).

More information is on the INCOSE UK website.

ASEP and CSEP Exam

Gaining ASEP or CSEP Accreditation requires passing the certification knowledge examination.

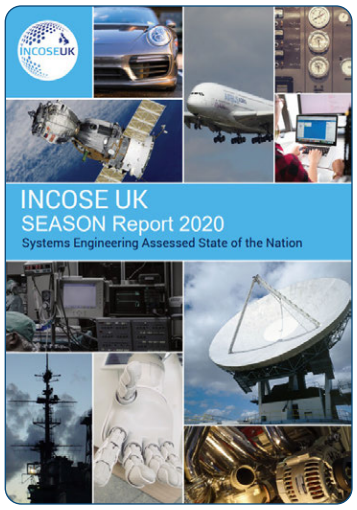
INCOSE UK offers their members the opportunity to sit a paper version of this exam, which is on the INCOSE Systems Engineering Handbook v4 and comprises 100 multiple choice questions.

The next examination will take place on Friday 25 September in the INCOSE UK Secretariat Office in Ilminster, Somerset, England.

You can find more information, including booking, here.

INCOSE UK membership is mandatory for anyone wishing to register and sit the examination.

INCOSE UK SEASON Report 2020

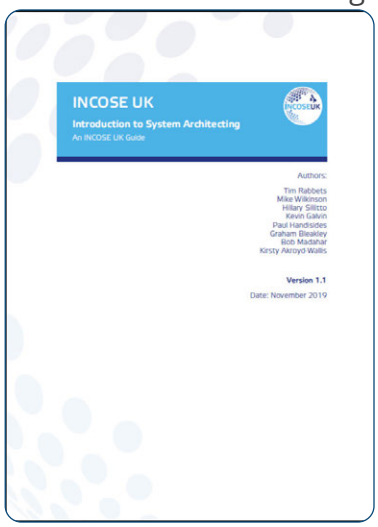


The United Kingdom has a proud history in engineering and technology and was one leading nation for developing and codifying systems engineering. This *SEASON* report assesses the Systems Engineering state in the UK in 2020, following previous reports published in 2009 and 2014. We live in the age of significant systems challenges. Global challenges such as food, health, security, and climate change are ever-more demanding. Society recognises sustainability is a necessity not a luxury. There is a constant pressure for ever more complex and integrated systems in all aspects of our lives. These challenges place new demands on the needed system types, their connectedness, and society's success expectations. Systems engineers are linchpins in responding to these challenges and it is our opportunity to rise to these challenges. To achieve this however, the systems engineering practice must continue to evolve, so as systems engineers we have the processes and tools for the job.

A free PDF of the *SEASON Report* is available from the INCOSE UK website and a purchasable hard copy is available from the INCOSE UK Online Store.

Introduction to Systems Architecting

At a high level, this guide covers system architecture who, what, when, where, why, and how in relation to all systems, irrespective of their level, scale, composition, form, or construction. It covers the basic concepts and principles, the benefits, and the different architecture uses. It also defines the basic architecting processes, the enabling methods and tools, and explains the role of the architects involved with them. The guide is accessible, yet not over-simplified, comprehensive, yet not over-long. It assumes no prior knowledge in the subject area but provides a springboard for further investigation. For those readers seeking more detailed information, key references cited throughout point to further information sources, providing access to an extensive body of detailed material.



The *Introduction to Systems Architecting* is available from the INCOSE UK Online Store.

AIAA's Journal of Aerospace Information Systems Announces a Call for Papers on Systems Engineering's Top Space Challenges

Systems Engineering has permeated the engineering ethos in the same way information systems previously redefined the very approach to aerospace science. As systems engineering has grown, numerous core challenges have become paramount in the space domain. This special issue in the Journal of Aerospace Information Systems tackles four pressing, space-related Systems Engineering challenges that demand cross-disciplinary solutions.

This special issue's purpose is to collect and publish a selection of high-quality journal articles that describe and advance the latest systems engineering approaches in the aerospace information-related fields related to these systems engineering space challenges. This special issue seeks to elicit submissions from researchers and practitioners from a wide range of backgrounds who are interested in the enigmatic questions posed by AIAA's Systems Engineering Technical Committee.

Systems Engineering Space Challenges

1. Should mass still be a driver for most space missions?
2. Are existing required design margins in handbooks and standards adequate for modern space systems?
3. Should a systems engineering glossary/definitions/ontology be enforced to support the development of a space system?
4. Do space engineers need to learn Model-Based Systems Engineering to successfully adopt digital engineering?

Authors need not respond directly to one of the systems engineering challenges if the manuscript relates to the challenges or is in the spirit of solving complex systems engineering problems.

Deadline for Submitted Manuscripts: 1 March 2021
Anticipated Publication Date: 1 December 2021

<u>Guest Editors:</u>
Jeff Newcamp (jnewcamp@gmail.com)
Alejandro Salado (asalado@vt.edu)
Alessandro Golkar (alessandro.golkar@gmail.com)
Mike Miller (mikez.miller@gmail.com)
Wenjiong Gu (wg262@cornell.edu)

Working Group Updates

Combined Update from the CIPR, Healthcare, and OOSEM Working Groups: Resilient Hospitals Project Who We Are, What We are Doing

Howard Lykins, howard.lykins@verizon.net
John Juhasz, telepath.juhasz@yahoo.com
Mike Pafford, mepafford@verizon.net

Recently our society has become increasingly aware of credible threat scenarios with the potential to degrade our vital infrastructure's key segments. Such threats emanate both from natural phenomena, such as weather factors (including "space weather"—solar flares creating havoc on our power grid), and from human hostile actors via cyber, electro-magnetic, and physical assaults seeking destructive effects, especially the potential for wide-spread, long duration power outages.

The current COVID pandemic presents yet another threat vector capable of severe damage due to its effect on human resources. Nowhere has felt the impact with as much severity as within the general health care system, and hospital facilities specifically. Health care is one main vital infrastructure supporting our society.

Given these threat's severity and our interconnected infrastructure system complexity, an urgent need has evolved to seek solutions with the best available systems engineering approaches. Several years ago, INCOSE received a challenge from FBI/InfraGard and collaborating entity members appealing to bring our best "Systems Thinking" and methods to the problem. This appeal led to forming the current INCOSE Critical Infrastructure Protection & Recovery Working Group (WG), with a charter focused directly on those challenges.

The ongoing Resilient Hospital Reference Model (RHRM) Model-Based Systems Engineering (MBSE) project began as a joint volunteer effort involving multiple intra-INCOSE working group members. The project is a collaborative effort to improve hospitals with increased resilience to survive threats to critical infrastructure.

The core project team includes INCOSE MBSE experts—membership has now expanded beyond INCOSE to include Institute of Electrical and Electronics Engineers (IEEE), FBI/InfraGard, and healthcare community experts.

At present, RHRM MBSE project team members involve volunteers from three INCOSE working groups, two IEEE societies, FBI/InfraGard, and healthcare organizations:

- INCOSE Critical Infrastructure and Protection (CIPR) WG
- INCOSE Healthcare WG (HWG)
- INCOSE Object-Oriented Systems Engineering Method (OOSEM) WG
- IEEE Communications Society and Engineering Medicine & Biology Society
- FBI/InfraGard National Disaster Resilience Council
- Society for Disaster Medicine and Public Health
- National Association of County and City Health Officials

This joint project's purpose is developing a generic Reference Model as the basis for decision support tools any hospital can use for:

- planning for critical operation continuity during extended power outages in current facilities,
- improving resiliency to extended power outages and other catastrophes, and
- going beyond the traditional methods, establishing design principles and concepts for advanced solutions for robust, resilient healthcare systems.

Hospitals are increasingly dependent on sophisticated technology that cannot work without electricity. It is increasingly urgent that hospitals find a way to deal with long-term power loss; the question is not so much whether such a loss will happen as when and for what duration. Hospitals must be able to deal with a serious power loss without shutting down or overly limiting the critical services they

provide to the community. To do so, they must identify their critical operations and plan how to preserve them.

Beginning with Initial Project Planning (IPP) using the Lean Startup Method (LSM) and Agile, we have included medical practitioners in our work, and our plan is to continue using domain experts as our core team's members. MBSE by itself cannot solve the problem, but, as demonstrated in countless modeling efforts, it can provide vitally important insights and decision support to arriving at improved outcomes. This is the Resilient Hospitals group's foundation. Our group will use MBSE and Agile (Systems Engineering and Project Management) to develop a decision support system helping hospitals prepare for long-term power loss and minimizing negative impacts.

After reviewing the results from three LSM/Agile IPP workshops with domain experts from medicine and hospital operations, the RHRM MBSE project team began collecting information from various online sources, and currently is organizing the information to form a detailed Model-Based Concept Definition basis using the Object-Process Methodology. We selected the Object-Process Methodology because it is a new approach combining a simple but powerful graphical notation for system structure and behavior with simple, easy to understand natural language sentences describing the same concept information.

Upon completing the initial Model-Based Concept Definition, the team will begin iterative development for incremental value delivery (Agile development), focused on evolving:

- Generic As-Is Reference Models of hospital critical operations, illustrating enhancement areas in coping with serious electrical power loss, and
- Guidance for applying these Reference Models to specific hospital instances for simulation, to improve individual hospital resilience including analysis, planning, tolerance, and recovery.

Figure 1 is a high-level RHRM MBSE Project Roadmap. The team plans to use this roadmap

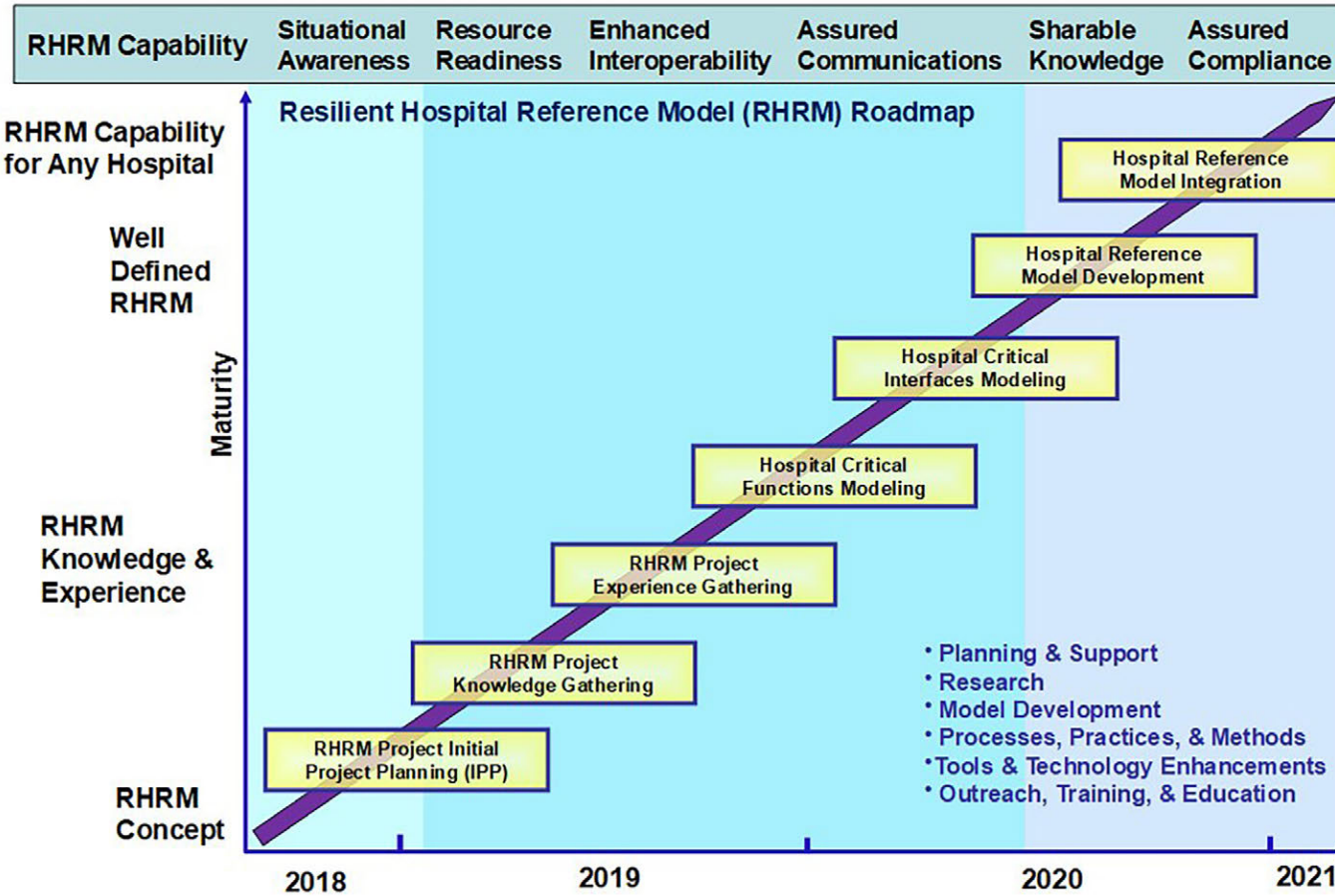


Figure 1: Resilient Hospitals Reference Model (RHRM) Roadmap

as a project focus mechanism and will update the roadmap as necessary as it continues to collaborate with project key stakeholders.

The development team is confident the Resilient Hospital Reference Model (RHRM) and resulting decision support tools will provide a unique and useful means of improving hospital critical operations during long-term electrical power loss. Systems engineers, modelers, healthcare professionals, and others working together toward a common goal of improving the nation's healthcare system will develop the RHRM. Collaboration across domains and expertise areas is of utmost importance. If you are interested in contributing to a useful and interesting project, please contact the project lead, Howard Lykins, or another author.

Healthcare Working Group: 6th Annual Systems Engineering in Healthcare Conference Goes Virtual in November

Robert J. Malins
rjmalins@eaglesummittech.com

The Sixth Annual Systems Engineering in Healthcare Conference—originally scheduled for 28-30 April cancelled due to the pandemic—is now a virtual event in November. Our conference goal remains the same: sharing the latest Systems Engineering topics' best practices as applied to both medical devices and healthcare delivery, and our conference theme remains "Advancing the Practice of Systems Engineering in the Healthcare Industry." This virtual event is a transition between last year's in-person event and our third quarter 2021 event we hope will return to in-person activities.

The Healthcare Working Group is new to hosting a virtual conference and we have many lessons to learn and details to work out. Our current plan is hosting the event as three half-day sessions on sequential Fridays in November. The first session will be Friday, 6 November 2020. Holding the second and third sessions, on 13 and 20, will depend on speaker numbers. We currently plan this to be a free event, although we will require registration to obtain the event password. Agenda details and attending links will be available shortly. Please stay tuned to the conference website (https://www.incose.org/hwg-conference/) to gather more details.

Speakers Invited: If you submitted a presentation proposal at the original conference, then you have already received a query from EasyChair asking about your participation interest in this event. If you have not responded to this message, please do so. We strongly encourage all previous submitters to participate in this event. We will automatically accept you submission for the virtual sessions.

The Healthcare Working Group welcomes additional submissions describing applications to medical technology and healthcare delivery of the following

- Agile and Lean Methods
- Systems Engineering Tools Best Practices
- Quality Assurance/Compliance/Safety
- Modeling and Simulation
- Systems Engineering Skills Development
- Healthcare Delivery: Simulation, Systems approaches, and Home Health Delivery

Presentations can be 30 min, 60 min, 90 min, 120 min, or a half day (a tutorial). Each half-day session will comprise four 1-hour blocks with 10-minute breaks between each block.

If you have interest in contributing to the virtual event, please contact a conference executive committee member: Kelly Weyrauch (kelly@AgileQualitySystems.com), Robert Malins (rjmalins@eaglesummittech.com), and Chris Unger (Christopher.Unger@med.ge.com)

Please stay tuned to our working group public website (https://www.incose.org/incose-member-resources/working-groups/Application/healthcare), the conference website (https://www.incose.org/hwg-conference/), and our LinkedIn group (https://www.linkedin.com/groups/3853728/). We will provide additional details as we develop them.

Requirements Working Group

Tami Katz
familykatz@earthlink.net

Requirements Working Group News and Happenings!

It has been a busy first half of 2020 for us in the Requirements Working Group (RWG). We are actively writing our three products, and we have engaged our working group members with a guest presentation series addressing methods and approaches to requirements engineering.

Our three new products include the *Needs and Requirements Lifecycle Manual*, led by Lou Wheatcraft; the *Guide to Developing and Managing Requirements*, led by Kevin Orr; and the *Guide to Verification and Validation*, led by Raymond Wolfgang collaborating with the IV&V Working Group's Jim Armstrong. Along with these new guides, Mike Ryan leads an update to the *Guide for Writing Requirements*, to better align it with the Requirement Working Group products. The entire product structure, including how the manual and guides align with the INCOSE Systems Engineering Handbook and SEBok, shown in Figure 1. We are pleased these new products also support the CAB needs as we aim to provide industry and academic community value.

Some of our past meetings, held monthly, include the following great presentations (thank you to all the guest speakers!):

- Reuse Company approach to Quality of Requirements and Tie to Guide to Writing Requirements, Jose Fuentes, Reuse Company
- Development of ASME Standards Approach, Ralph Hill (Chair, ASME Plant Systems Design Standard Committee)
- Resilient Hospital Reference Model (RHRM) MBSE Needs Elicitation Process and Tie to Guide to Writing Requirements, Mike Pafford
- Integrated Data as a Foundation of Systems Engineering, Lou Wheatcraft

Coming up in 2020's second half, we plan to have a guest presentation by William Bearden on the ISO/IEC/IEEE 29148 Requirements Engineering Standard, as well as virtual "Ask the Expert" sessions for requirements engineering, where members will discuss real challenges they address and obtain insight from our RWG leaders. If you would like to participate in these please feel free to join the RWG in the INCOSE profile for "join committees" to be on our mailing list.

Our products will mature and review throughout the year, and we look forward to offering review copies to our RWG members later this year as well as our ultimate goal of releasing them in 2021.

Thank you to all the great input from our RWG community, and we look forward to continuing our dialog on Requirements!

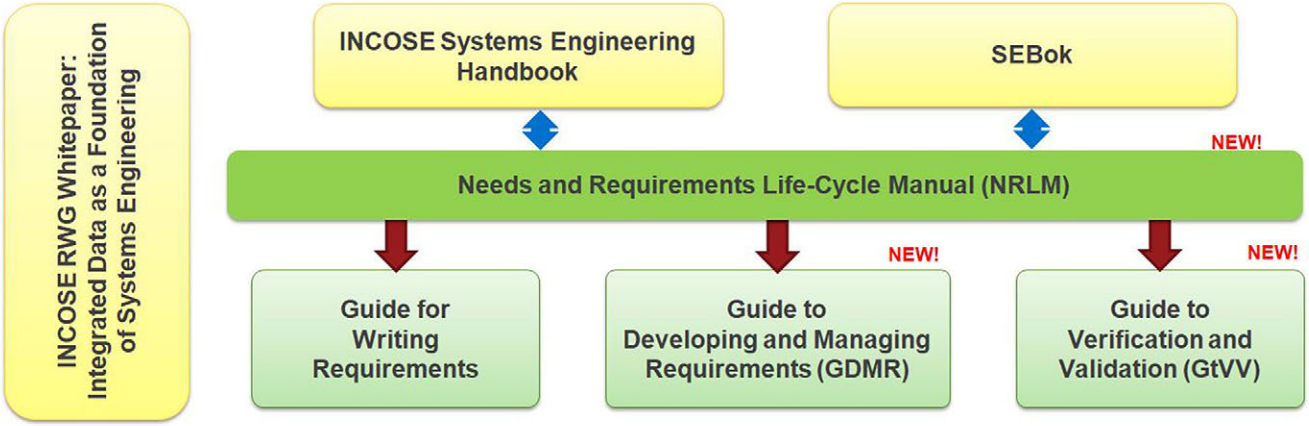


Figure 1. RWG Product Tree July 2020

EWLSE Updates

Alice Squires, ewlse@incose.org

Empowering Women EWLSE Diversity Focus Update

Alice Squires
ewlse@incose.org

Empowering Women Leaders in Systems Engineering (EWLSE) sends our best wishes for your safety and health during the global pandemic as we continue to pursue our vision of a world where systems engineering leadership equally represents women and men. We have three diversity related panel reports for the second quarter. The American Society of Engineering Education's (ASEE) Corporate Member Council led "Diverse Voices from the Classroom", the first panel at the annual ASEE conference in June. The second panel, "The Role of Diversity, Equity, and Inclusion in the Future of Systems Engineering," was our first EWLSE event in Australia held at the SETE 2020 Virtual Systems Forum in early July. The third panel, "The Role of Diversity, Equity, and Inclusion in Sustaining Earth's Future," was our EWLSE panel at the INCOSE International Symposium 2020 in July. Please see separately written articles for each event following this short update.

For other news, the EWLSE Pubs team; comprising Lisa Hoverman, Alice Squires, and David Long; continues making progress on our *Letters to My Younger Self (LTMYS): How Systems Engineering Has Changed my Life*. 26 letters—written to 13 younger men and 13 younger women—give insights on the systems engineering journey. We plan to publish LTMYS, already INCOSE Impactful Products team approved, in 2021. A second EWLSE team; comprising Heather Feli, Alice Squires, and Marilee Wheaton; is progressing on a future Springer Hill book series for women authors: Emerging Trends in Systems Engineering Leadership. We anticipate around a dozen chapters.

Whether new to systems engineering or practicing for decades, if you are seeking a systems engineering mentor or ready to be a systems engineering mentee or both, please sign up here: https://bit.ly/2G6TJPL. And if you are passionate about helping with our mentoring initiative we need you, please contact use at incose-mentor@incose.org.

How do you advocate for women leaders in systems engineering? Please send your stories to ewlse@incose.org.

Diverse Voices from the Classroom

Alice Squires,
ewlse@incose.org

Cynthia Murphy-Ortega (Chevron Corporation), supported by Stephanie Amrite (National Instruments) and Alice Squires (Washington State University), led the panel "Diverse Voices from the Classroom" for the American Society of Engineering Education's Corporate Member Council where recent engineering graduates shared their transitioning experiences from student to workplace. A short background and some lessons learned from each panelist is below.

Sarah Heywood (Figure 1) graduated October 2018 from Georgia Institute of Technology earning a bachelor's in aerospace engineering and currently supports The Boeing Company's planning and management. She found college classroom diversity a big positive change; more women came into her discipline at Georgia Tech than in high school. However the university could improve by continuing its diversity and hands-on activity support after admissions. When it came to industry, corporate representatives would come to

Figure 1. Sarah Heywood Enjoying Large Fumaroles in Hverir, Iceland

the university and share information on the company. Now she has been in industry; she appreciates Boeing's STEM outreach initiatives to many different groups and younger ages she did not experience as a student. One difference she found when it came to diversity acceptance was the university preferred you accepted your peers, the workplace expects it. At work, she said you either love your co-workers or you are done. She appreciates her workplace encouraging diversity and inclusion.

Owen Paul (*Figure 2*) graduated May 2018 from Florida State University with a mechanical engineering bachelor's degree and is the student ambassador technical program specialist at Mathworks. Owen noticed great diversity at Florida State and he appreciated finding peers who understood his family background from the Caribbean, but he did notice there were not as many women and especially he found all male teams did not perform as well as his teams with both women and men. He had two universities belonging to his program, and thought they could have better integrated the two universities within the classroom instead of students choosing separate classroom sides and forming teams only from their own university. When it came to industry, Owen found even greater diversity by participating at an international level. He found it daunting at first but it has been a great experience working with people from around the world and sharing different cultural experiences. For him, understanding the different experiences really made it feel more like a team.

Figure 2. Owen Paul in Marching Band (High School and College) Playing the Tuba

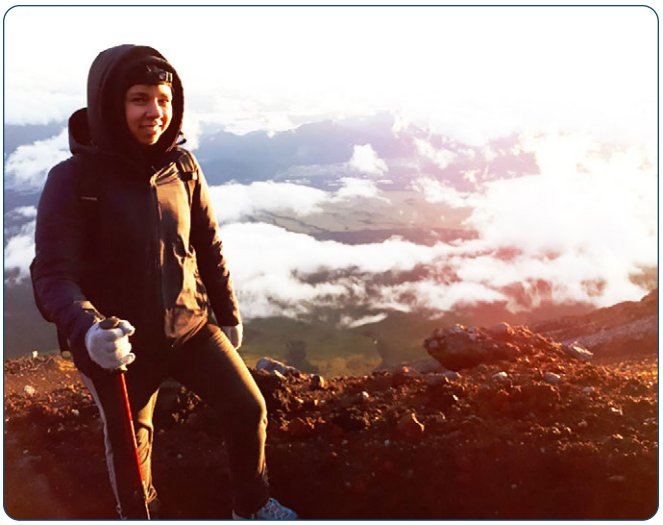


Figure 3. Sarah Ben Rejeb Hiking Mt. Fuji at 5am

Sarah Ben Rejeb (*Figure 3*) graduated May 2020 from Montreal, Canada's Concordia University with an electrical engineering bachelor's degree and is an electrical engineer at Digital Industries' Siemens Canada. She felt she belonged more in university because the diversity—she found both people from her own background and many from other backgrounds— which enriched her experience as an engineer. Montreal is a diverse city and diversity reflects in the university and she found great diversity in her group projects. Expanding Owen's gender diverse team value point, she provided an example where an all-male team designed an innovative bathroom but forgot to include sanitary baskets for women showing a lacking diversity decreased the project's value in including all people. Her university encouraged self-expression and welcomed joining any group on campus. Her university had many clubs and groups with industry participation and this helped her forge relationships with industry. She completed an internship at Siemens the summer before her senior year and Siemens considered her an employee during her final university year allowing her to participate in Siemens training opportunities. This preparation supported her transition to industry. However, when she started at work, she found she was very different from everyone else there. She came from a francaphone (French speaking) province where the majority speak French and the minority speak English, at the university it was mostly anglophone (English speaking). When she moved to work

at Siemens, everyone was mostly francophone, male, 30 and older, and, in her experience, women did not typically enter the sales and technical support division she was in. Being a woman, anglophone, and a visible minority, everyone wondered who was this young woman coming into the division? It was a very interesting experience but also very welcoming. Everyone shared their experience with her, as much as she wanted to learn, and they were very keen in teaching her what they knew.

The Role of Diversity, Equity and Inclusion in the Future of Systems Engineering

Stueti Gupta
stueti.gupta@incose.org

"The Role of Diversity, Equity and Inclusion in the Future of Systems Engineering" panel (*Figure 4*), a paper presentations and invited talks series part, is one of the first Australia EWLSE events. The panel, originally planned for the SETE 2020 conference postponed due to the pandemic and reformatted to Virtual Systems Forum, took place at the end of June, beginning of July. The panel included challenges and success stories in this area and leading industry practices including panelist personal stories on the topic.

The following were panel members (*Figure 5, on the following page*):

- [Moderator] Serge Landry: Principal Consultant & Trainer at Equilibrant Force and INCOSE Director for Asia Oceania (https://www.linkedin.com/in/landryserge/)
- Ruth Harrison: Rocket Woman Founder (https://www.linkedin.com/in/rocketwoman/)
- Stueti Gupta: BlueKei Solutions Co-Founder and Director and INCOSE India Chapter President (https://www.linkedin.com/in/stueti/)
- Kathryn Burr: Systems Engineering Integration and Test Director at Boeing Defence Australia (https://www.linkedin.com/in/kathryn-burr-a94bba27/)
- Helen Williams: Director Transport Integrated Systems Capabilities, Transport for New South Wales (https://www.linkedin.com/in/helen-williams-beng-mraes-ceng-58867430/)

The panelists covered various topics, some insights are below.

Serge Landry—Overcoming Data Biases

Data proliferation and rapid unchecked new data set use inside the latest applications regularly leads to disastrous results and public credibility loss.

Figure 4. Panel Introduction

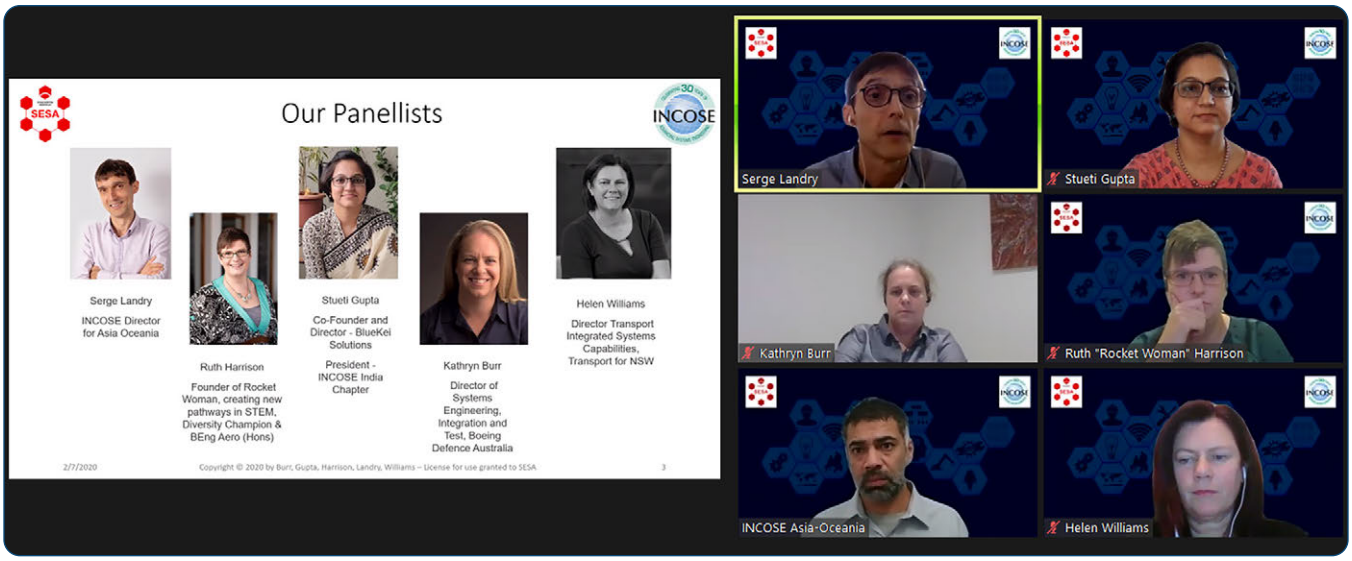


Figure 5. Our Panelist

If engineers are serious about achieving the intended results, they need to increase their data bias understanding to better apprehend:

- how to deal with data choices,
- their adequacy for solving certain problems and,
- how to rectify the possible data set imbalances.

Ruth Harrison—How do we grow diversity within STEM?

Systems engineering has a unique placement for diversity to have the greatest impact and ethics helps attract diversity and future engineering design. Diversity within systems engineering is vital going forward and must include considering different viewpoints at every development cycle stage.

Would you want to work for a company which does not care about the things important to you? Would you want to join an industry which does not care you have a different viewpoint or different experience?

Systems engineers can look to the challenges your user group may face, how to rememberyour system's legacy and what will be your project's external influences.

By increasing representation within Systems Engineering we will not only create more direct spaces for diversity but will also have a knock-on impact to ensure including more diverse thoughts in engineering projects.

Stueti Gupta—Thinking "Systems"

As it has been evident in the last few months, we have seen immense participation from industries not catering to healthcare but still coming together to manufacture ventilators in preparing to meet the healthcare system's needs and addressing the pandemic. And there are many solutions at the ground level not covered in the news channels, but were innovations by communities fighting the pandemic. Did we include them to solve any past healthcare problems when there was no pandemic, even though they are part of the system? Do we implicitly assume we cannot involve them even though they are part of the system?

The call for action and why it matters. It is important to be contextually and culturally sensitive as not everyone sees the world through the same lens, have the commitment and courage to bring more voices to the table, be curious and empathetic to how others see and dissect the problem at hand and thereby make informed design choices and build what we will use. Perspective diversity will help uncover why systemic events happen and help understand the system structure, the relationships, and mental models of people in the system influencing the structure and behaviour.

Kathryn Burr—Intrinsic Barriers to Diversity

Systems engineering is fundamentally about managing risk. The ability to assess risk comes through experience in a domain or through longevity within a systems engineering lifecycle. As an inter-disciplinary approach, systems engineering practically requires an engineering background before moving into systems engineering. This creates difficulty for those outside the domain or early career engineers to bring new, diverse ideas into a systems engineering program. Often, incremental improvement is the best achievement, rather than transformational improvement.

Some ways we can address the barriers are:

- Make diversity in team composition a priority by including experience balance and an outsider's voice
- New pathways for early career engineers need to help them enter systems engineering programs
- Make space for non-engineers within systems engineering teams

Helen Williams—Members' value proposition for SESA

After hearing how perspective diversity can create a better outcome, SESA should provide a collaborative and collegiate space for a diverse range of engineering, technology, and human centred disciplines from various industries, an environment which leverages and integrates knowledge and experience. The question becomes how to attract and retain a diverse membership, embracing all diversity forms. We should focus on identifying who is our current and future membership, understanding their needs and expectations, and continually evolving the professional society's offering and delivery. Through leadership and culture, we can achieve engagement and thereby growth and increasing group effectiveness.

Learn more about EWLSE vision and mission here—http://incose.org/ewlse. To contribute to Diversity, Equity, and Inclusion within systems engineering community, please contact the INCOSE EWLSE leadership team.

The Role of Diversity, Equity and Inclusion in Sustaining Earth's Future

Suja Joseph-Malherbe, suja@letter27.co.za
Stueti Gupta, stueti.gupta@incose.org
Lamona Rajah, lamona.rajah@cummins.com
Alice Squires, ewlse@incose.org
Alan Harding, alandharding@gmail.com

We had the privilege of hosting this panel discussion at the first International Symposium 2020 virtual event (*Figure 6, on the following page*). We explored how our ability to integrate diversity, equity, and inclusion (DEI) in our approaches and practices will affect the planet, its resources, and the human race's long term sustainability. As the more diverse world population and increasingly interdependent global community trends continue, underrepresented communities could impact imbalances in access, opportunity, and power having far-reaching negative effects on the planet's future.

We started off by sharing what it is we mean when we use the terms diversity, equity, and inclusion.

- Diversity is appreciating and respecting all the ways people differ not strictly visible differences (gender, age, race, disability). It is about diverse thinking achieved through creating a team with diverse personalities, thinking styles, working styles, background, expertise, and life experience. The question we seek to address is, "Who has a seat at the table?"
- Equity is having equal opportunities and support to succeed and grow. The question we reflect on is, "Who is trying to secure a seat at the table but can't?"
- Inclusion is a sense of belonging and here the question is, "Has everyone's ideas been heard in a respectful manner and not just tolerated?"

Addressing DEI is important to potential engineering growth and innovation. It creates opportunities to adapt and find creative approaches to the engineering grand challenges we face, including the United Nations Sustainable Development Goals.

As stated earlier, diversity is not strictly visible differences. It is creating teams with diverse thinking and as a result the team members

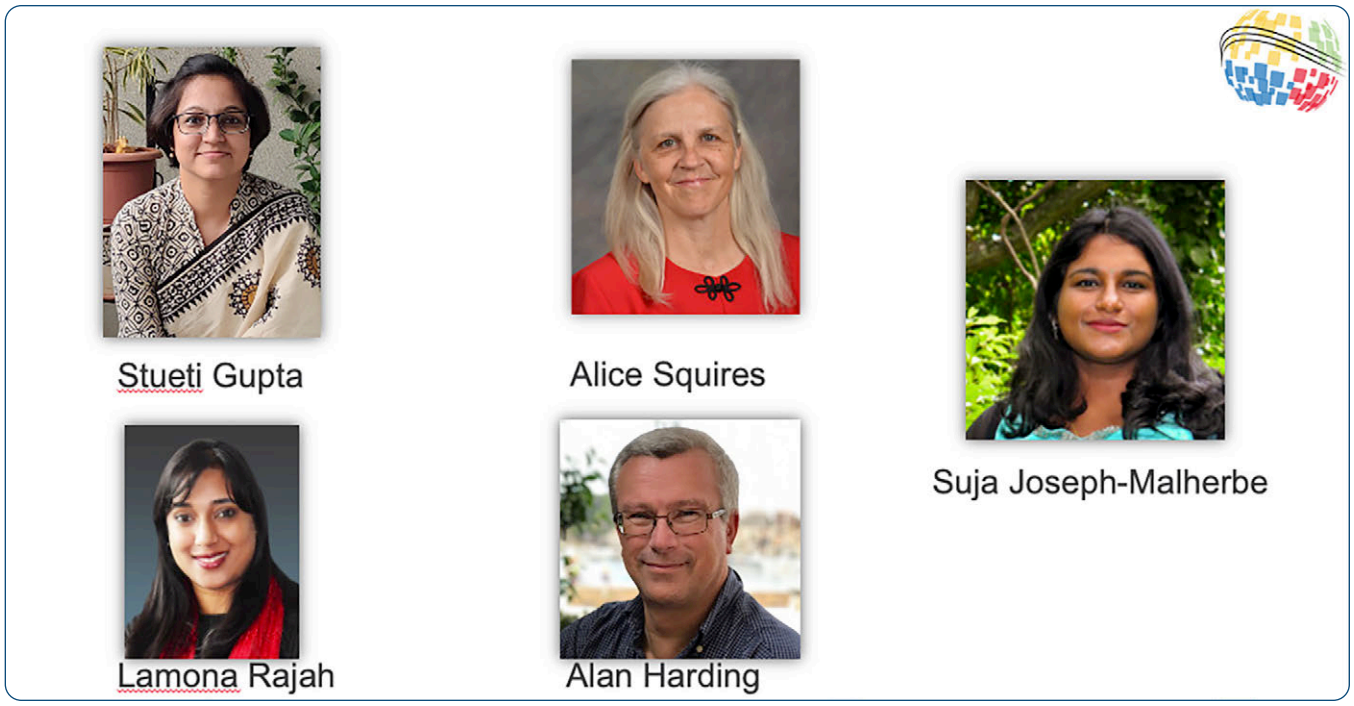


Figure 6. Diversity, Equity, and Inclusion in Sustaining Earth's Future Panel.

will experience multiple viewpoints, have their own views and contributions challenged, and in the process, formulate sustainable solutions achieving better results for the world's future.

This will only work if the environment is also inclusive. Inclusion is creating the space team members, customers, and communities work and live in and have a sense of belonging. When team members are their authentic selves in the workplace and feel valued, they willingly sharing their thoughts and ideas. In both instances, research shows diversity and inclusion encourage better creativity and innovation.

In the following paragraphs, we share thoughts from four vantage points.

Stueti Gupta. Sustainability is meeting the present needs without compromising future generation's ability to meet their needs. As Nelson Mandela said, "It is in your hands, to make a better world for all who live in it," the simplest and maybe the toughest is starting with oneself.

We need to deepen our system challenge understanding and keep educating ourselves. We need to recognize and test assumptions as our learning and experiences condition our thinking. It is time to uncover what implicit assumptions we may hold.

We need to build micro habits to initiate the action. We cannot solve the grand challenges in one day. Employee Resource groups, Business Resource groups, community groups, and working groups are great forums for underrepresented voices to build community and bring impact. The engagement in these forums can help address system challenges by defining local and global strategies.

Finally, silo approaches have limited our ability to build a comprehensive understanding of system challenge's interconnected nature. Systems approach will help form the common ground for cultural changes, enabling us to better forecast or understand policy decision outcomes with not just technical analysis but the underlying structure, interconnectedness, feedback loop impact, and delays. This will empower us to synergize and collaborate when generating and using evidence based on concepts and formal methods.

Our approach to sustaining earth's future is only possible when we go beyond our siloes and think "systems." Band-aid fixes or ad-hoc solutions will not work anymore.

Lamona Rajah. My position was how a DEI mindset may accelerate environmental sustainability effort adoption at community

grass root level. However, lacking cultural intelligence, ignorance, beliefs, and assumptions about how solutions, developed for a developed market, integrate into developing markets are barriers. We should address mindset barriers and find ways to overcome them. We discussed a few tips to start this journey:

Challenge our beliefs about talent. Perceiving the world solely through our personal worldviews causes blind spots, because we look for what we already know. Talent in local markets may look different, speak differently, and approach problem-solving differently. Leverage knowledge, skills, and talent in local communities to develop relevant sustainable engineering solutions to human issues.

Harness indigenous knowledge, skills, and historical solutions to problems. Learn problem solving customs and social norms. Refine existing knowledge and skills if necessary and develop new ones through collaboration. Disrupt relying on external expertise to develop solutions not consumable by local communities. You may need to return to language barrier and difference basics in understanding words and phrases from culture to culture.

Understand cultural norm's dynamics. Know where knowledge and power reside. For example, some cultures feel less comfortable engaging superiors or people in authoritative positions and may be uncomfortable challenging ideas from superiors or sharing ideas unless invited to do so. In these situations, the way we position proposals and seek information is critical.

Beyond applying cultural intelligence, learn advocacy and allyship to tap into "protected" knowledge and gain buy-in for solutions. You must learn where power lies, and who to get buy-in from first, this serves as a catalyst for accelerating acceptance. Allies from the community help win over detractors and gain public support for interventions from within the group we are trying to influence.

Make a conscious effort to learn more about inclusive behaviours to improve cultural intelligence and truly embrace and leverage diversity.

Alice Squires. According to the Global Challenges Foundation "... the next 50 years will set the pace for humanity's survival in the next 10,000 years." My position is division over how to proceed with global challenges drives exclusive behaviour and inequities remaining largely unrecognized today by those involved, creating obstacles to our achieving the best possible long-term solution for our planet and the human race's future. I propose the following:

At the individual level, we need to develop competencies in cognitive and affective perspective-taking—followed by cognitive and affective empathy. Cognitive perspective-taking supports the ability to infer another person's thought or beliefs. Affective perspective-taking supports our ability to infer another person's feelings or emotions. The empathic equivalent allows us to think and feel what others think and feel; to take on another's mental perspective and share the emotional experience.

At the team level, global decision-making teams need to be both cognitively diverse and representative of the global community. The focus needs to be on enabling thought diversity in an open environment where each person has communication equity and psychological safety. We need to seek multiple perspectives and embrace a paradoxical mindset (the ability to seamlessly hold two opposing ideas in our mind—both true) to effectively develop superior and equitable global solutions.

At the global level, we need to embark on a path to developing a total optimal affordable—as measured by Earth's ecosystems—global solution for all people supporting Earth's sustainability for as long as feasibly possible and also supports the even longer term human race viability.

Alan Harding. My position combines two topics about which I am passionate—sustainability and DEI. I made two points:

Clearly "sustaining earth's future" requires us to meet the UN Sustainable Development Goals, which comprise 17 goals further broken down into 174 targets. Each goal and target demands a socio-technical system change, which may be a change in governance, behaviour, or even culture—hard to achieve. Getting away from the

jargon, this means people are at the heart of the systems needing to change. All the evidence suggests we must have these stakeholders make these changes, and therefore we must include everyone concerned and ensure they have an equal (equitable) seat at the table.

My second point is simpler: We need to apply systems approaches to help address the Sustainable Development Goals and do it to the best degree possible. The evidence is clear; organization and team performance is best when the team fully embraces all diversity aspects in an effective and integrated team. Therefore, in forming systems engineering teams we must have DEI at our thinking's forefront. For more background on this point please go read "Towards a more inclusive INCOSE" published in INCOSE INSIGHT Volume 22, Issue 3.

To conclude, the following quote by Susan Freeman-Greene, Engineering New Zealand's CEO, captures this dialogue's essence,

"Unless engineers represent the world they serve and the communities they serve, then engineers will design a world that doesn't reflect those communities and that perpetuates these global challenges."

How are you participating in this conversation?

Please feel free to connect with us to continue the dialogue.

Mentorship: A Win-Win Proposition

Heather Feli & Terje Fossnes

Mentee's Perspective by Heather:

I was registering for International Symposium 2015 in Seattle, Washington and there it was—A checkbox

"Would you like to participate in the mentorship program at IS2015?"

Even though I had been an INCOSE member since 2009, attended two International Symposiums (IS) and became a Certified Systems Engineering Professional (CSEP) in 2014, I still felt alone, shy, and overwhelmed at the symposiums. Perhaps you have experienced it too? The anxiety of finding a table to join at meals or the awkwardness of attempting small talk at the social events.

Thankfully when asked 'Would you like to participate in the mentorship program at IS2015'? I checked the "yes" box. I did not know it at the time, but I had hit the mentor jackpot. My IS2015 assigned mentor was Terje Fossnes. Yes, Terje and I had the typical mentor-mentee conversations; and yes, I got more out of IS2015 than any symposium before. That was just the beginning of a winning proposition.

IS2015 advertised a new working group called Empowering Women as Leaders in

FYI Information and Tools for Now

Presidential Feedback on the First-Ever Virtual IS

Hello Everyone,

We held a meeting this week with the Past Presidents Advisory Group (PPAG). At the meeting and after we received a big thank you for our efforts and notes of encouragement. I would like to forward you some shared words—"What a long way you have come in four months!! I am so impressed at the agility of the Board and INCOSE leadership in general!"

> "The creation of a virtual IS at only a couple of months' notice, the adaptation of INCOSE operations and the delivery of new, remote services to the membership are a huge credit to all those involved, and I would encourage you to share this message with the Board and with the leadership in general. INCOSE continues to be a very special organisation with a bright future! Congratulations!!"
>
> "Great job. And let us know if there is anything we can do to help."

Once again, thanks everyone for great efforts, diligence, and passion to keep INCOSE moving forward.

Cheers, Kerry

Systems Engineering (EWLSE). I could not find the meeting details, so I asked Terje. Within a few hours Terje had the EWLSE meeting time and location and personally introduced me to EWLSE founder, Dr. Alice Squires. Terje continued to check in and introduce me to other INCOSE members including his wife, Cecilia Haskins. We all joined EWLSE propagating the win-win.

Fast forward to 2016, I received an invitation from Alice Squires to be a panelist at IS2016 for Empowering Women as Leaders in Systems Engineering in Edinburgh, Scotland. My first time speaking at an International Symposium. During my presentation I looked over the audience, front and center was Terje (and Cecelia a few rows back). Two of the busiest INCOSE members had "shown up" for me.

It was also at IS2016 I started hearing about INCOSE's new Technical Leadership Institute (TLI). Terje connected me with all the TLI information. In 2018 with a nomination from Alice with Terje's support I applied and TLI Cohort #4 accepted me. As part of TLI Cohort #4 my INCOSE network immediately grew by 20 people and my ties to INCOSE grew exponentially. This represented the win-win-win proposition for me, two seasoned members, and for INCOSE at large.

This brings us to present day. INCOSE's Technical Leadership Institute inducted me at IS2020 last month. Our cohort successfully completed two IS products—an international leadership panel and a published paper. I am currently co-editing the Emerging Trends in Systems Engineering Leadership book with Alice Squires and Marilee Wheaton.

What originally was a 4 day IS mentorship in 2015 has evolved into 5 years. Terje is not officially my mentor and we followed no traditional mentoring "rules." We have made it a tradition to meet at each International Workshop or Symposium to catchup and we email. The relationship has included Terje generously listening, providing feedback, sharing stories and experiences, helping me making connections, and often just being a friendly person in the room at INCOSE social events. This emphasizes not all mentoring relationships need to be formal, regimented, or

Terje & Heather at IS2019, Orlando.

time and effort consuming to be effective, and to encourage others to engage in this process.

I cannot quantify the impact this chain of events has had on my life and career over the last 5 years. The word "gratitude" does not feel adequate.

- *Cecilia Haskins*—Thank you for your generous social capital and positional power. You have a gift for bringing others along and not letting us get lost in the crowd.
- *Alice Squires*—Thank you for your continued opportunity, time, and support gifts. I am so grateful to you for helping me make TLI's two years of leadership experience a reality for me.
- *Terje Fossnes*—You embody mentorship's truest form: Generously listening, being supportive and trust worthy, helping me navigate and network within INCOSE, advocating for me, and most importantly consistently being there. These last 5 years have not felt like mentoring but more like conversations with a friend. I am so grateful

when I look back at my experiences and opportunities over the last 5 years and see us meeting at IS2015 was the catalyst.

Mentor's Perspective by Terje:

Volunteering to be a mentor at IS2015 has been, in retrospect, a very personally rewarding decision. At the time I checked the "yes" box in my registration form, I did not have a clear picture of what I was committing to, other than possibly making the symposium experience easier to navigate for another INCOSE member. I am very thankful Heather and I matched to each other.

In addition to my accumulated knowledge and experiences about INCOSE, I perused the INCOSE website in order to prepare for the assignment. In my mind, sharing information and knowledge works best as a dialogue. The mentorship program also encouraged 'meet and greet' opportunities with people in different INCOSE leadership and influential roles, as well as other symposium attendees during lunches and breaks. At the same time, the mentorship program did not prohibit other commitments, presentations, or events I wanted to attend during the symposium.

Heather's dedication to systems engineering and INCOSE, to better herself by learning from others, and her challenging me on many levels motivated me. It soon turned out we also had great personal chemistry and respect for each other, which made the interaction easy and enabled good communication. It has been—and still is—an inspiration to continue the interpersonal professional relationship started 5 years ago.

It is our hope this editorial can inspire and motivate others to engage in mentoring and informal information sharing about INCOSE and systems engineering, with or without an organized mentorship program.

[*Editor's Note:* Nancy Rundlet proposed the first IS mentor program for IS2013 in Philadelphia and periodically revived it at other events].

[*Lisa: a note from Cecilia*—give a point of contact for "finding a mentor"—use me if you want to Cecilia.haskins@incose.org]

FYI

Information and Tools for Now

System Engingeering Return on Investment

One of the most common question for Systems Engineers is to justify the Systems Engineering effort – as it looks like "extra work." What is the Return on Investment? This webinar showcase explores the Return on Investment from Systems Engineering. Eric Honour presents over a decade of research results into the quantified systems engineering value. These major results, based on interviews with 51 programs, show the statistically proven relationships between systems engineering activities and the technical, schedule, and cost success of programs. The results show nearly all systems engineering activities correlate with better project success, and provides detailed values beginning to answer how much is enough. Results also show, somewhat surprisingly, current systems engineering activities do not correlate with the technical quality of the product systems. If you missed this truly seminal information this showcase is an opportunity to catch up.

Additionally, there will be a Zoom Q&A – on Friday 25th September at 6pm BST – see the Webinar Showcase home page to register.

Call for Articles: Aug 2021 *INSIGHT*

Rick Dove, dove@parshift.com and Erick Palmer, erika.palmer@ruralis.no

A joint Open Project of the INCOSE Working Groups for:
Social Systems and Agile Systems and Systems Engineering

Theme: The Social Dimensions of Systems Engineering

Mission: To spur systems engineering social aspect appreciation and adoption. In many cases social aspects receive an ad hoc and informal treatment, yet they are a successful system engineering activity's core. These articles intend to broaden understanding with both real practitioner experiences and emerging knowledge in the encompassing systems engineering domain.

Systems engineering in all life cycle stages is a techno-social operational activity. Social interactions occur among human-human, human-technology, and technology-technology relationships (a robot team adapting to situations during a shared mission).

Mission-relevant aspects include stakeholder engagement, detecting and mitigating social dysfunction, life cycle social activity within and beyond development, agility enablement, societal systems, system relationships to social norms and laws, and many others.

Approach: The Theme Issue will accommodate ten articles, of digestible length. *INSIGHT* has about 1,000 words on text-only full pages. Tables and graphics add space (highly encouraged). Digestible *INSIGHT* articles generally run 2000-4,000 words of text. The *INSIGHT* audience is the systems engineering community concerned with systems spanning multiple engineering domains. Articles have broader influence when they do not speak exclusively to a single engineering domain or a single project type.

Schedule—all dates are no later than:

15 August 2020:	Call for Articles issued.
30 September 2020:	Submit intent declarations and working title, with short working abstract. Theme Editors will respond with a submission invitation or suggestions relative to mission fitness.
30 November 2020:	First draft complete submission.
20 December 2020:	First draft feedback comments returned.
15 January 2021:	Second draft submission, if appropriate, for review at International Workshop 2021. To be determined January 2021: Live review: 15-minute presentation with 10-minute feedback at International Workshop 2021 in person or virtual.
25 February 2021:	Review comments returned to authors for improvement, as appropriate.
30 April 2021:	Final draft submission, formatted for required style, with IP Release.
30 June 2021:	Shortly after this date *INSIGHT* editors may contact authors directly with copy-editing suggestions.

To be determined August 2021: INCOSE *INSIGHT* publication.

continued on the following page

Call for Articles: Aug 2021 *INSIGHT*

General guidance

Articles must speak meaningfully to systems engineers.

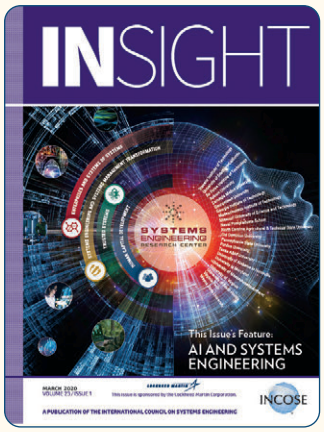
- The mission is the objective.
- We encourage a fuller article treatment for an International Symposium 2021 paper, for those interested authors.
- All authors will receive the *INSIGHT* style and citation guides, and IP Release form.
- These are not journal articles. 2000-4000 words is the target.
- Do not use the Microsoft Word reference tool, make them standard text formatted per *INSIGHT* style guide.

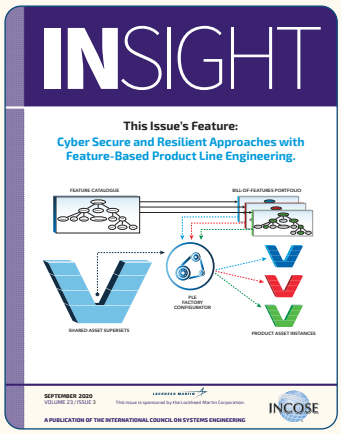
Evaluation Criteria:

- Fit to the theme, and meaningful to systems engineers and systems engineering issues
- Advances the mission
- Publishability: length (2,000-4,000 words), writing quality, logical, and comprehensible

Submissions: All submissions should be Microsoft Word, 12-point Times New Roman, single spaced, indented paragraphs, with minimal or no (preferred) style use. With one inch margins on 8-½ x 11-inch layout. This is about 4 pages of text, excluding graphics. We highly encourage graphics as they do not detract from word-count. NO PDF. Send submissions to both theme editors erika.palmer@ruralis.no and rick.dove@parshift.com, attached as an Microsoft Word document. Include a title, and also author name(s) and email address(es) in the by-line underneath the article title. Also include short author bios.

Updates to this call-for-articles will be at www.parshift.com/t/call.pdf.





Academic Council and Cyber Security

Alice Squires, alice.squires@incose.org

Cyber and System Security Education for Engineers

INCOSE, through the Academic Council, is an American Society of Engineering Education (ASEE) member. This year, INCOSE's ASEE liaison Alice Squires moderated cyber and system security panels for both the ASEE 2020 and INCOSE International Symposium 2020 annual conferences—both held virtually—in June and July, respectively. The panelists were either INCOSE members, cyber security educators, or both. This article reports primarily on the ASEE 2020 panel titled "The Many Facets of Cyber and Systems Security Engineering Education." The panel covered university cyber security programs, how educators integrate cyber security into the curriculum, and professional societies', such as INCOSE, role.

Listed below are the panelists for the ASEE 2020 conference along with panel presentation highlights.:

Peggy Brouse (George Mason University), pbrouse@gmu.edu, panelist for both ASEE 2020 and INCOSE International Symposium 2020 panels. Highlights include:

- Developed the country's (United States) first bachelor of science (BS) cyber security engineering program at George Mason University in Fairfax, Virginia. The program she developed is the first and only ABET—accredited BS cyber security engineering program as of mid-2019.
- The degree, approved in 2015, graduated its first cyber security engineering class comprising 25 students in May 2018, 41 students in May 2019, and has 489 declared students as of 2019's third quarter.
- The program emphasizes systems engineering to prepare students for the proactive engineering design of physical systems incorporating cyber security from the system development beginning. Curriculum sought input from constituent organizations. It is an interdisciplinary 126 credit hour degree with courses taught by faculty from four different departments as well as industry-practitioner adjunct professors (major company and federal organization vice presidents, chief security officers, and cyber engineers)
- Active research initiatives include: automotive cyber physical system security; electronic medical record privacy; securing wireless networks; cryptographic implementations in HW, SW, and embedded systems; securing emerging aircraft signaling standards (ADS-B); civilian and military blood supply chain safety; digital forensics analysis for networked and cloud based devices; insider threat identification based on active and passive behavioral indicators; positive train control: securing radio (passenger and cargo) controlled trains; secure communications for automotive V2X networks (civilian & special purpose)
- Peggy has offered to support those who desire to develop similar programs at their university. See: http://volgenau.gmu.edu/cse.

Doug Jacobson, dougj@iastate.edu, panelist for ASEE 2020 panel. Highlights include:

- First created a cyber security minor at Iowa State University in 2015. The degree starts with the computer engineering bachelor's degree and replaces 32 credits with cyber security courses.
- Started a cyber security engineering bachelor's of science in mid-2019; enrollment by 2019's third quarter was over 80 students (32 freshman and 50 transfers from computer science, computer engineering, and systems engineering). The first graduates will be May 2020.
- Planned ABET accreditation is 2021.
- See: https://www.ece.iastate.edu/cybersecurity/.

Radu Babiceanu, babicear@erau.edu, panelist for ASEE 2020 panel. Highlights include:

- The cybersecurity engineering master's of science program started 2014 at the Embry-Riddle Aeronautical University in Daytona, Florida,
- The graduate degree prepares students to address cybersecurity issues throughout a system's lifecycle, starting from the early design to implementation, testing, updating, and system decommissioning. In the aviation and aerospace domains, many systems are safety-critical, and emphasizes cybersecurity threat and vulnerability safety implications. Students also learn how to attack and defend cyber systems.
- See: https://erau.edu/degrees/master/cybersecurity-engineering.

The virtual ASEE 2020 conference included an informal survey where attendees responded to two polls. The first poll asked the participant's opinion on cyber and systems security engineering education importance (*Figure 1*). The second poll asked participants about the cyber and security engineering education status in their university (*Figure 2*). In both cases, these were informal polls and the participants comprised an attendee subset (total number not known) of *The Many Facets of Cyber and Systems Security Engineering Education* live virtual session panel and the results should be in that context only.

The virtual ASEE 2020 annual conference received the panel well and for those who registered for the conference, the panelist recording remains available for access until June 2021. In related news, Keith Willett (United States Department of Defense) and Peter Beling (University of Virginia) joined Peggy Brouse to support a second lively panel on cyber and systems security at virtual INCOSE 2020 annual conference.

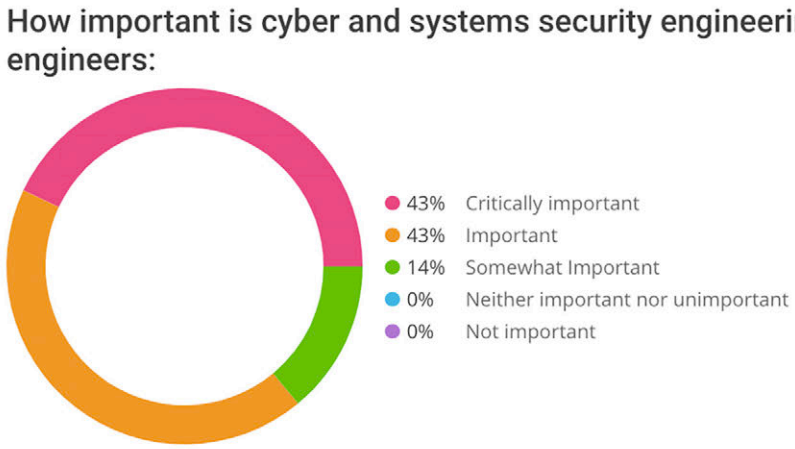


Figure 1: Perceived Cyber and Security Engineering Education Importance of Panel Attendee Subset

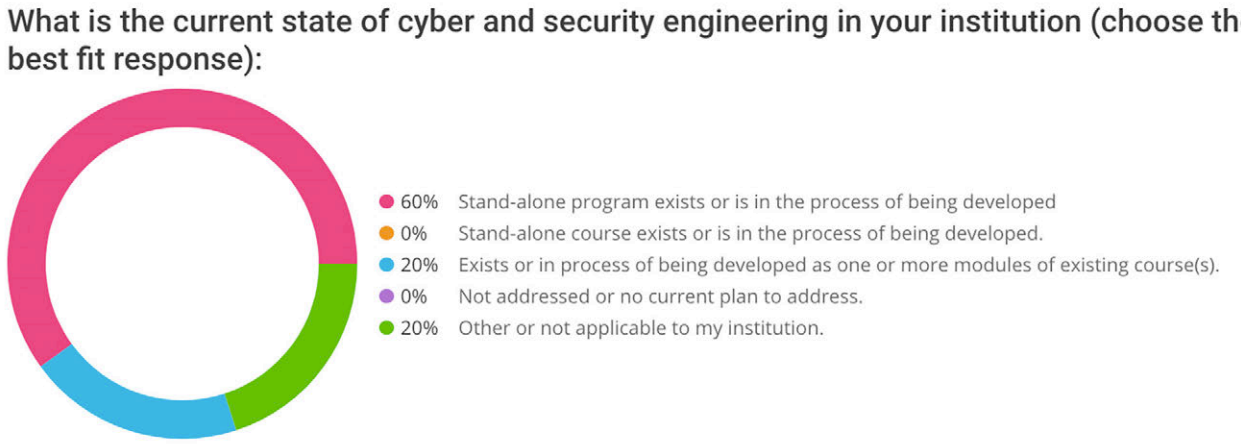


Figure 2: Current Cyber and Security Engineering Education state for a Panel Attendee Subset

Highlighting 30 Working Groups for the INCOSE 30th!

Lisa Hoverman, marcom@incose.org

This year at the INCOSE International Workshop (IW), the premier conference to contribute meaningfully to the state of the art in systems engineering, 47 Working Groups (WGs) spanning topics from Artificial/Augmented Intelligence to Configuration Management to Digital Engineering to Empowering Women Leaders in Systems Engineering to Model-Based Systems Engineering, to Natural Systems, to Smart Cities, to Social Systems, to Telecommunications, and more gathered in Torrance, CA to work on the big and complex challenges facing our planet.

The working groups self-organize and self-report at the end of the workshop. Most working groups are open sessions so new members can attend, learn about the work, and engage at the level that is right for them. The work the group does at the IW and reports on from their time spent working together at the IW is available on the INCOSE website here. If you are a new member, or a member looking to get involved in a working group, this is a wonderful place to start learning about what INCOSE is up to, and where you might want to contribute!

As part of our 30th year celebration, we are going to highlight 7–8 working groups each Newsletter in 2020 to showcase their work, provide insight to what we do technically in INCOSE and how we contribute back in a big way to the larger Systems Engineering Community! In this issue, we are highlighting 7 working groups we hope you enjoy learning about and will potentially join!

WG16—AI Systems

Chair: Thomas Shortell, thomas.m.shortell@lmco.com
Tom McDermott, tmcdermo@stevens.edu

Members: 20 members

Purpose/Mission

The AI Systems WG seeks to establish INCOSE as a recognized expertise resource for AI systems research, development, and application.

Goals

Methods, processes, and tools for Artificial Intelligence (AI) including Autonomous Systems and Machine Learning

Scope

Focus using Artificial Intelligence in the system of interest and using Artificial Intelligence in systems engineering.

IW Outcomes

- Completed Initial Kickoff
- Completed Initial Brainstorming Session

Planned Activities

- Multiple internal team projects

Planned Work Products

- SEBoK Articles
- Webinars/Brown Bags

Why join the AI Systems WG

- Growing working group
- Relevant Topic
- Work of the Future

WG17—Complex Systems

Co-Chairs: Michael Watson, michael.d.watson@nasa.gov
Ali Raz, akraz@purdue.edu
Michael Do, michael.do@comcast.net

Members: 20 active members with 40 in working group community

Purpose/Mission

Enlarges the Complex Systems Science and Systems Engineering intersection, focusing on knowledge not addressed in current systems engineering documentation such as standards, handbooks, and textbooks. Applicable sciences include chaos, complexity, complex adaptive systems, nonlinear static and dynamics, networks, social science, neuroscience, evolution, power law, ecology, and others.

Goals

Although complex analysis is important, our goal is making a difference in synthesis (new system creation). Therefore, we want to develop useful products helping INCOSE members and their organizations.

Scope

CSWG intends to collaborate with other working groups (System of Systems, System Science, and Natural Science) to understand the complex systems' nature from various working group perspectives and it's applications across different industry domains.

IW Outcomes

- Joint sessions enhancing System of Systems, Systems Science, Natural Systems, and Sociology of System Engineering collaboration
- Primer updates (Complex System Definition)
- Inputs to Systems Engineering Handbook, Rev 5
- Artificial Intelligence Systems Engineering Primer
- Radar Chart to consider complex systems characteristics
- Complexity Management
- Complexity Levels
- Complexity Modeling Tools

Planned Activities

- Joint sessions enhancing System of Systems, Systems Science, Natural Systems, and Sociology of Systems Engineering collaboration
- Artificial Intelligence Systems Engineering Primer
- Radar Chart considering complex systems characteristics
- Complexity Management
- Complexity Levels
- Complexity Modeling Tools

Planned Work Products

- Primer updates (Complex System Definition)
- Inputs to Systems Engineering Handbook, Rev 5

Why join the Complex Systems WG

- Many collaboration opportunities
- Involvement with many systems engineering aspects
- Numerous projects planned

WG18—Empowering Women Leaders in Systems Engineering

Chair: Alice Squires, ewlse@incose.org
Erika Palmer, erika.palmer@ruralis.no
Stueti Gupta, stueti.gupta@gmail.com
Lisa Hoverman, lisa@hsmcgroup.biz
Co-Chair: Marilee Wheaton, MarileeJ.Wheaton@aero.org
Lauren Stolzar, lstolzar@gmail.com
Erik Specking, especki@uark.edu
Gina Guillaume-Joseph, ginagj@mitre.org
Heidi Hahn, drsquirt@outlook.com
Stephanie Chiesi, schiesi@gmail.com

Members: 204 members

Purpose/Mission

A world where systems engineering equally represents women and men as leaders.

Goals

- Create a systems engineering environment welcoming to all
- Promote women's demonstrated value as systems engineers and leaders
- Engage women in engineering and systems engineering at all education levels around the world
- Enable increased woman participation and retention in systems engineering leadership.

Scope

- Increase women participation in systems engineering and engineering leadership
- Broaden current state awareness of women in systems engineering and engineering leadership through research
- Remove obstacles for women seeking leadership roles in related engineering fields
- Enable success through collaboration with professional societies, industry, government, academia, and individual advocates
- Celebrate diversity benefits throughout our culture.

IW Outcomes

- Spread women leader awareness in systems engineering through our Empowering Women Leaders INCOSE buttons (and we are all out).
- Recorded two related videos—one on Empowering Women and creating a world where women and men collaborate together seamlessly is the norm, and one on diversity, equity, and inclusion's essential roles in building a better world through a systems approach.
- Held activity looking across the life cycle at design decision consequences on society and gender
- Reviewed the diversity's state in INCOSE—findings from analyzing and comparing INCOSE data and membership
- Reviewed 2019 INCOSE Practitioner's Challenge—cleaning the Ganges River Basin
- Reviewed INCOSE Technical Leadership Institute requirements and related women in leadership and engineering stories
- Reviewed how the INCOSE certification process adapted for international applications
- Held a training session on Negotiating, Influencing, and Power including real-life case scenarios
- Reviewed next steps for *Letters To My Younger Self: How Systems Engineering Has Changed My Life*
- Announced a chapter call for *Emerging Trends in Systems Engineering Leadership*

Planned Activities

- Cross collaboration with Training Working Group
- EWLSE 2020 Planned Events at the following conferences including one new one established by EWLSE:
  - Asia Oceania: INCOSE Japan Symposium JCOSE 2020, SETE 2020/SESA 25th anniversary, CSD&M Asia 2021
  - EMEA Sector: 18th International Conference of Women Engineers and Scientists ICWES18, NoSE: Nordic Systems Engineering Tour 9th NoSE Spring Tour 2020, new EWLSE Swedish event in Fall
  - Americas Sector: Conference on Systems Engineering Research (CSER 2020), American Society of Engineering Education (ASEE 2020), Society of Women Engineers (SWE 2020)

Planned Work Products

- Building content for above activities and events (panel, workshops):
  - Exploring the digitization of Human Bias
  - The Role of Diversity, Equity, and Inclusion in Sustaining Earth's Future
  - Increasing Gender Diversity through Professional STEM Societies: What works, what does not, and defining the path forward
  - Hearing Diverse Voices from the Classroom
- Ebook: *Letters to My Younger Self: How Systems Engineering Has Changed My Life*
  - In Round 3 of letters, planning public presentation

- Springer Hill Book: *Emerging Trends in Systems Engineering Leadership*
  - Written by women with acknowledged contributor and reviews

Why join the Empowering Women Leaders in Systems Engineering WG

- Very active working group
- Working on prominent societal issue solutions
- Numerous project opportunities

WG19—Resilient Systems

Chair: John Brtis, jbrtis@johnsbrtis.com

Co-Chair: Scott Jackson, jackson@burnhamsystems.net

Members: 70 members

Purpose/Mission

The Resilient Systems Working Group's mission is establishing systems resilience—a new subdomain of systems engineering—understanding and approach.

Goals

Develop, accumulate, and promulgate knowledge relating to achieving resilient systems.

Scope

Resilience is the ability to provide required capability in the face of adversity.

IW Outcomes

- Planned support for Loss-Driven Systems Engineering Initiative
- Planned next SEBoK content revision
- Planned next Systems Engineering Handbook content revision

Planned Activities

Leadership and collaboration among the Loss-Driven Systems Engineering specialty areas.

Planned Work Products

- Loss-Driven systems Engineering theme *INSIGHT* issue, September 2020
- Revised SEBoK content
- Revised Systems Engineering Handbook content

Why join the Resilient Systems WG

- Partnership with the Loss-Driven System Engineering specialty areas
- Heavily involved with the SEBoK and Systems Engineering Handbook
- Developing a systems engineering subsection

WG20—SE in Early Stage Research & Development

Chair: Ann Hodges, alhodge@sandia.gov

Members: 65 members

Purpose/Mission

The Systems Engineering in Early Stage Research and Development (ESR&D) Working Group's (WG) purpose is providing an open forum for systems engineering principles, best practices, and solutions development, application, and dissemination to scaling systems engineering applications to ESR&D projects so the systems engineering effort level is commensurate with risk and to achieve the anticipated ESR&D outcomes.

Goals

This WG will provide a forum for soliciting, enhancing, and communicating the most relevant systems engineering principles and activities and will create the greatest value for ESR&D projects. It will engage other INCOSE working groups and external organizations sharing similar interests and goals. This WG will provide knowledge, guidelines, and frameworks for systems engineering application in ESR&D.

Scope

The ESR&D WG will promote and apply systems engineering principles emphasizing policy, analysis, and concepts useful to scientists, researchers, systems engineers, and these group's leadership for the lower TRLs(1-4) and provide strategies, standards, and concepts for better approaches. It will promote and perform activities supporting the stated goals.

IW Outcomes

- Socialize the Charter
- Brainstorm on an ESR&D SE framework containing guidelines and processes for the "right" and "right-sized" tailored systems engineering practices and products based on a 1-4 TRL and other characteristics such as organizational culture and philosophies.

Planned Activities

- Analyze IW20 brainstormed ideas
- Identify near- and longer-term tasks and products
- Establish the working group cadence
- Identify leads for working the identified tasks
- Survey potential leverage references
- Establish a systems engineering-research translation dictionary
- Identify interfaces with other INCOSE working groups

Planned Work Products

- Will establish near-term tasks and products with the team
- Longer term:
  - *INSIGHT* Papers
  - IS talks
  - ISO 15288 guide for early stage R&D
  - "Dictionary"
  - Primer

Why join the SE Early Stage Research & Development WG

- Long-term focus
- Collaboration emphasis

WG21—Systems Security Engineering

Chair: Rick Dove, dove@parshift.com

Co-Chairs: Beth Wilson, wilsondrbeth@aol.com

Kennith Kepchar, eagleview2@cox.net

Keith Willett, Keith.Willett@incose.org

Members: 15 active members with 135 in the WG community

Purpose/Mission

This working group's mission is providing systems engineers and systems engineering with effective means and methods for sustainable system functionality under advanced adversarial attack

Goals

- Establish the responsibility for security within systems engineering, practiced and accepted as a fundamental systems engineering part
- Establish self-sustaining cross-community involvement between systems engineers, security engineers, and system security standards
- Establish systems engineering guidance for enabling effective systems security facing evolving system security needs
- Attract an international, engaged participant cadre

Scope

- Instill systems engineering responsibility for sustainable systems functionality facing intelligent, determined, and highly competent system adversaries
- Facilitate responsibility assimilation and dispatch
- Instigate self-sustaining cross-community involvement between systems engineers, security engineers, and system security standards

IW Outcomes

- Reviewed past projects and WG Overview for new people
- Reviewed nine wip project updates, one opportunity, four FuSE papers, and one project kickoff for SEBOK work

Planned Activities

- Paper presentation at April Systems Security Symposium
- Collaborations with NDIA

- FuSE security topic collaboration with FuSE collaboration community
- Collaboration with Product Line Engineering WG
- Systems engineering security priority needs collaboration with CAB
- Collaboration with Loss Driven Systems Engineering WG.
- Continued security standards body work

Planned Work Products

- Panel session at IS20 if accepted
- IS20 2 FuSE paper final completions if accepted
- IS20 Presentations on FuSE papers if accepted
- Completing *INSIGHT* August Issue with twelve Security for PLE Variation papers.
- Additional FuSE Security Topic papers
- Systems Security Engineering SEBoK material

Why join the Systems Security Engineering WG

- Relevant Topic
- Seeking engaged participants
- Well organized

WG22—Transportation

Co-Chairs: Dale Brown, dale.brown@hatch.com
Allison Ruggiero, Allison.Ruggiero@nyct.com
Denis Simpson, Denis.Simpson@jacobs.com

Members: 250+ members

Purpose/Mission

The Transportation Working Group (TWG) seeks to advocate for and facilitate a continuous improvement of planning and engineering decisions made within the Ground Transportation sector over the entire system life-cycle and deliver 21st Century Transportation Systems providers and users need through pragmatic Systems Engineering practice application on three levels:

- Executive—Shaping Policy & Public Sentiment
- System—Improved Acquisition
- Operational—Better Inform

Goals

- Promote and develop a competent Transportation Systems Engineering Practitioner's community
- Develop papers to present during International Symposium and Workshops
- Develop work products facilitating systems engineering practice tailored for Ground Transportation
- Maintain interest in systems engineering practice through regular, periodic presentations and meetings
- Establish working relations with other professional organizations such as APTA or AREMA
- Propagate systems engineering practice throughout disparate stakeholder groups, such as procurement and legal

Scope

Based on current industry procurement practices, Ground Transportation is an Infrastructure subsidiary sector in most large transportation projects and programs:

- Ground-based people and goods conveyance systems (moving sidewalks)
- Vertical conveyance systems (Elevators & Escalators)
- Heavy Rail (Passenger and Freight)
- Bus, Bus Rapid Transit
- Transit and Light Rail
- People-Movers, Trams, Monorails
- Roads and Highway systems
- Marine Transport Systems
- Ride share systems

IW Outcomes

- New Charter Approval
- Operating Plan Review
- Volunteers added to fill TWG Steering Committee gaps
- Collaboration with other WG organized for 2020

- Discussions with IWG, CIPR, AWG, Smart Cities Initiative
- Monthly TWG meetings firmed-up
- IS2020 Planning
- APTA Systems Integration Standard project overview

Planned Activities

- Revised Operating Plan
- Volunteers added to fill TWG Steering Committee gaps
- Collaboration with other WGs throughout 2020
- Monthly TWG meetings each month with interesting presentations
- IS2020 Planning continues
- Generate IS2020 Flyer
- Contributions to APTA Systems Integration Standard
- Contribution to Case Studies Library

Planned Work Products

- TWG Webinars
- IS2020 Flyer
- SE101 Guide Series expansion
- Case Studies Library—new case studies added
- APTA Systems Integration Standard—Collaborative Review Comments

Why join the Transportation WG

- Transportation is part of everyday life
- Involved with numerous other working groups
- Well established

FYI Information and Tools for Now

New & Updated INCOSE Policies

New Policies

BOD-104 Past President Advisory Group (PPAG) is a new policy stating past presidents, the current president, and the current president-elect will meet quarterly the month before board meetings to provide the current president and president-elect advice and answer questions.

REC-115 Certification Champion Award is a new award presented at the International Workshop based on highly significant positive contributions to the INCOSE System Engineering Professional program over a sustained multi-year service period lesson shorter than 3 years total within a 5-year period. A recipient may receive this award multiple times, but each award must be sufficient on its own merit.

Updated Policies

ELC-100 Nominations & Elections Committee clarified the campaigning section for INCOSE Leadership candidates. They can send individual emails from their personal accounts to individual emails in the INCOSE directory, and they may post election messages using personal accounts on INCOSE social media subject to any limits by MARCOM. They may not post to social media from INCOSE social media accounts nor send e-mails to INCOSE e-mail distribution lists.

The TEC-107 INCOSE Technical Product Development and Commercialization policy added accessibility information including hearing and vision access definitions and the associated provisions. Also updated was the intellectual property information stating INCOSE owns the copyright, and if not, treat the product as if coming from an affiliate arrangement.

To review the complete policy, please go to https://www.incose.org/about-incose/policies-and-bylaws.

INSIGHT Preview

William Miller Editor-in-Chief, insight@incose.org
Dinesh Verma, dverma@stevens.edu

INSIGHT Preview From the Editor-in-Chief

William Miller, insight@incose.org

INSIGHT's mission is providing informative articles advancing the systems engineering practice state. The intent is accelerating knowledge dissemination closing the gap between the practice state and the research state as *Systems Engineering*, the Journal of INCOSE, also Wiley published, captures. INCOSE thanks corporate advisory board member Lockheed Martin for sponsoring *INSIGHT* in 2020 and welcomes additional sponsors, who may contact the INCOSE marketing and communications director at marcom@incose.org.

The *INSIGHT* August 2020 issue's theme is a joint INCOSE Systems Security Engineering (SSE) Working Group and Product Line Engineering (PLE) Working Group project to bring systems security into product line design. We thank theme editors Beth Wilson and Bobbi Young and the authors for their contributions. The SSE Working Group's mission is providing systems engineers and systems engineering effective sustainable system functionality means and methods under advanced adversarial attack. Their objectives are instilling systems engineering responsibility for sustainable systems functionality facing intelligent, determined, and highly competent system adversaries; facilitating responsibility assimilation and dispatch; and instigating self-sustaining cross- community involvement between systems engineers, security engineers, and system security standards. The PLE Working Group's mission is promoting PLE and related systems engineering best practices and to coordinate activities around PLE at the INCOSE level and share results. The working group's objectives are helping our members acquire knowledge comparing to the state-of-art, share concerns, experiences, good practices, and traps to avoid while providing guidelines to set up and evolve organization PLE.

We encourage you to check out the relevant and exciting articles on PLE in this edition. We hope you find *INSIGHT*, the practitioners' magazine for systems engineers, informative and relevant. Feedback from readers is critical to INSIGHT's quality. We encourage letters to the editor at insight@incose.org. Please include "letter to the editor" in the subject line. *INSIGHT* also continues to solicit special features, standalone articles, book reviews, and op-eds. For information about *INSIGHT*, including upcoming issues, see https://www.incose.org/products-and-publications/periodicals#INSIGHT.

Note From the Editor

Lisa Hoverman, newsletter@incose.org

Happy 30th Anniversary INCOSE! How well you have handled 30! This Newsletter and our recent successful 30th International Symposium are testaments to this organization's resiliency and solid foundation. The world is dramatically different in this 30th year of INCOSE - 2020. The skills of systems engineers, systems thinkers are in demand more than ever beyond the traditional domains that have defined systems engineering. We continue to see so many of our wonderful CAB companies and systems engineers working to globally at every level on the problems facing us—please, check out our posts on social media highlighting these efforts, and encourage your fellow systems engineers to continue on! There are some remarkable stories out there, and more emerging daily! We have a great line-up of content planned for Q4 and the next Newsletters.

In celebrating our 30th Anniversary and in light of our ongoing quarantined state, INCOSE is

offering some fantastic Virtual Community Offerings!. Please, check those out! Our Systems Exchange Cafes seem to be the biggest hit, and I encourage you to join one! Our Certification group held some fun reSEPtions recently as well, and we are looking forward to the feedback from those!

The INCOSE 30th International Symposium was by far a huge success, and you can see a great re-cap from a first time attendee on page 5. This event was terrific in that it afforded those who have never had the ability or finances to attend the INCOSE IS to do so this year. Those attending experienced amazing systems engineering content, timely discussions, lively panels, and much-needed networking. There is nothing quite like the INCOSE IS, and this year turned out to be one of our best ever. Check out some highlights on our INCOSE YouTube Channel!

We hope you fully enjoy the third issue of the Newsletter, with highlights of INCOSE in quarantine, and preparing for a hybrid or virtual INCOSE International Workshop. This event will also be unique in that it affords those who have never had the ability or finances to attend the INCOSE IW to do so this year. If you have never been, I strongly encourage you to attend. You will experience the ability to work on amazing systems engineering content, be involved in powerful and impactful systems discussions, panels, and networking. The INCOSE IW is a great place to work as a systems engineer and thinker, and this year promises to be one of our best ever.

The Newsletter continues to grow to inform our readership on all things INCOSE, both current, upcoming, and historical. There are some interesting previews on the upcoming and exciting 2020 virtual happenings, at the chapter level, sector level, all the way up to the IW, with a save the date for our next IS! Newer to this Newsletter are Updates from the INCOSE Board of Directors. Check out what the Asia-Oceania Sector Director, the Chief Information Officer, and the President-Elect who leads Special Initiatives and Projects for INCOSE are all up to and leading in 2020. They have some excellent content to share!

Please keep sharing your publications with us as we continuously work to improve. I hope that you see some of your suggestions and contributions in this issue. As always, we welcome feedback and contributions at newsletter@incose.org.

We look forward to seeing you participating, networking at, and presenting at, one of the many terrific upcoming virtual INCOSE events. I end with a sincere note of appreciation to all who contributed to this Newsletter. Have a wonderful September, stay healthy and I really hope to see you online at the upcoming IW!

INCOSE Member Newsletter

Publication of the International Council on Systems Engineering

Editor: Lisa Hoverman, newsletter@incose.org

Member Services: INCOSE Administrative Office info@incose.org

+1 858 541-1725

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:

- Q1 Newsletter, General Content (GC): 15 Feb, Late
- Breaking News (LBN): 25 Mar
- Q2 Newsletter, GC: 15 May, LBN: 25 May
- Q3 Newsletter, GC: 15 Aug,, LBN: 25 Aug
- Q4 Newsletter, GC: 15Nov; LBN: 25 Nov.

For further information on submissions and issue themes, visit the INCOSE website as listed above.

Who are we? INCOSE is a 17,000+ 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.

Follow us

7670 Opportunity Rd, Suite 220
San Diego, CA 92111-2222
USA
info@incose.org
www.incose.org
+1 858 541-1725