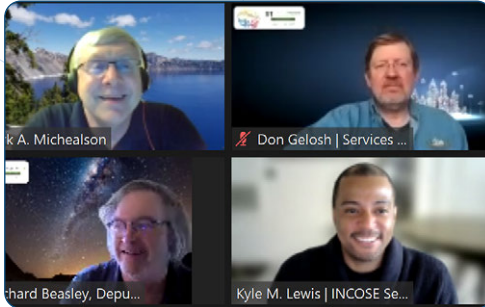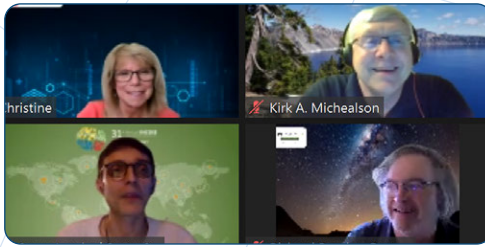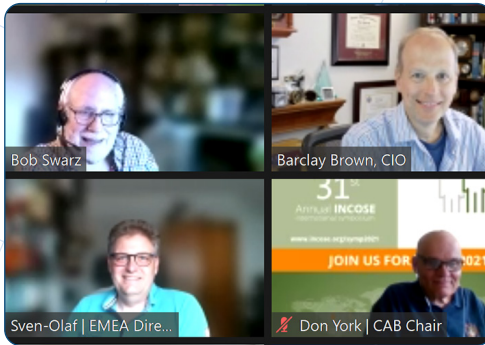# MEMBERS NEWSLETTER

September 2021—Q3

INCOSE

"Growth and comfort do not co-exist. We need to get out of our comfort zone to experience and learn new things. Being committed, stretching oneself will definitely unravel the potential within ourselves which we would not even have realised we had in our possession." —Stueti Gupta, Indian Women in STEM

President's Corner • Notes from the Board • Updates from the Board • New to INCOSE? • Americas Sector Updates • Asia-OceaniaSector Updates • EMEA Sector Updates • Call for Articles—*INSIGHT* June 2022 • INCOSE/SAE International Joint Membership Agreement • EWLSE Updates • *INSIGHT* From the Editor-in-Chief • Note from the Editor

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President's Corner
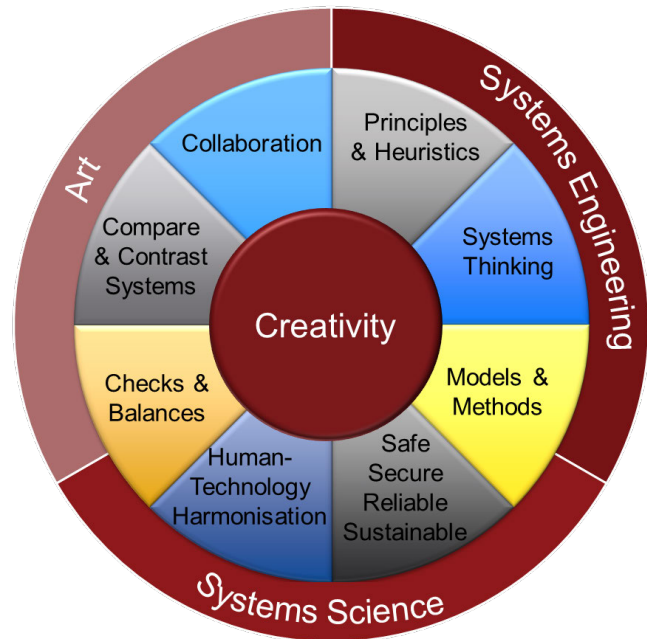
Kerry Lunney
kerry.lunney@thalesgroup.com.au

I am writing this to you after a very successful International Symposium (IS) 2021. It was a terrific event, and I hope those who had the opportunity to attend found it as informative, engaging, and enjoyable as I did.

In my opening address at the symposium, I presented what I refer to as the Systems Engineering Creativity Palette, a visual tool I developed to help systems engineers tackle difficult problems, whether complicated, complex, or otherwise. I thought it might be helpful to expand on it in this article. To begin with, there is always the question of systems science versus systems engineering. Does science lead engineering, or does science fall behind engineering? In systems, there is evidence of both. However, to create those elegant designs as described by M. D. Griffin in 2010, we will always need to include the "arts." Thus, it is not whether we need to consider the arts, science, or engineering when creating solutions, but rather the balance required across this combination.

This balance is not equal in any system developed, nor does it necessarily remain the same if reusing, modifying, or redeploying the system. Nothing guarantees repeatability. Over time, it could be dangerous as we lose the basis for the initial decisions and the ability to analyze changes. The challenge we sometimes face is "where do we begin?" When posed with such a question, I typically look within my references library and toolkit for a starting point. Within these resources, I have what I refer to as "prompts or back-pocket cues" that I have created depicting useful and concise systems engineering practices and approaches I can reference. These artefacts do not provide me with the answer but rather point me in a starting direction to face the challenge. The Systems Engineering Creativity Palette is one of my back-pocket cues.

It is important to note the Systems Engineering Creativity Palette blends the three facets—the arts, the systems science, and the systems engineering—providing the creativity needed to create an elegant design. Too many times, I have heard arguments of one of these facets dominating at the others' expense. This may be appropriate depending on the system and its operational environment, but this did not initially come about by ignoring one facet. Again, it comes back to my earlier comment on not guaranteeing repeatability.

Within the Systems Engineering Creativity Palette, the three facets contain eight elements guiding systems engineers in tackling difficult challenges. Below I briefly expand each element.

- *Principles and Heuristics:* Back to sound fundamentals. This is often the starting point when facing a new challenge or when nothing from your toolkit appears to work. Should this occur, go back to basics, and start again. The guidance we gain from principles and heuristics is invaluable.

- *Systems Thinking:* Balancing reductionism with holism. It is crucial not to lose sight of the whole when working in the deeper detailed system solution levels. Always keep rebuilding the complete picture from the parts and re-challenging past decisions and results, particularly performance, security, safety, sustainability, and resilience. If you do not, you will guarantee unwanted surprises from unintended consequences.

- *Models and Methods:* Apply your expanding toolkit. A systems engineer's toolkit can include proven practices, methods, and instructions; models, simulations, and other representations; applications; algorithms; reference documents; lessons learned; and many more, generally personalized tools based on the individual's experience and skill level. First, try to find something useful in the toolkit. Always remember to add to it if you apply something new to address the activity at hand.

- *Safe, Secure, Reliable, Sustainable:* Always expected, now we must meet! In the past, it was often the case for the customer to clearly spell out safety, security, reliability, and sustainability. This will not be the case in the future. With increasing non-deterministic behavior in some of our more complex systems and greater solution interconnectedness, we must expect to meet these four features, irrespective of use, deployment, operational environment, or contract constraints.

- *Human-Technology Harmonization:* Technical and societal acceptance. The general population is becoming more informed at a faster rate than previously experienced. Our awareness of sustainability, grand challenges, and the need to improve our current position is now more prevalent. Similarly, how we perceive and interact with technology is very important. This will require us to address our system solutions' sociotechnical aspects and consider the moral and ethical implications.

- *Checks and Balances:* We meet needs; all are satisfied. This is a simple reminder to the systems engineer to verify every output of each lifecycle phase with all the relevant stakeholders. Feedback is vital.

- *Compare and Contrast Systems:* Learn from other systems. A systems engineer should always consider other system solutions that may provide insight into the current challenge. Learning insights can come from natural systems, engineered systems, the human body, previous evolutions of the same or similar systems, and more.

- *Collaboration:* Together is better. Collaboration refers to teamwork, communication, and leadership, which are essential for a transdisciplinary approach for systems engineering. But a word of advice—do this without losing your authentic self. Individual participation is key to strong collaboration.

There is no set order of executing one element before another or completing one element before another. Likewise, there is no priority across the eight elements. Where you begin, how many activities you will have active at one time under an element, and how many elements you address in parallel will vary depending on the system solution challenge. What is important is addressing all eight elements.

You may think all eight elements relate more to the systems science and systems engineering facets. Yet, it is often the third facet, the arts, which provides a systems engineer with the creativity needed to move forward in each element when the answer or the next step is not forthcoming. I trust you will find this Systems Engineering Creativity Palette useful.

Lastly, on a completely different topic, I announced at IS 2021 that INCOSE **surpassed 19,000 individual members**. This is a great accomplishment and truly demonstrates the importance of our organisation to "address complex societal and technical challenges by enabling, promoting, and advancing systems engineering and systems approaches." This is our mission after all. Thank you, everyone, for contributing to our success and supporting INCOSE's future endeavors.

Keep well, keep safe.

Cheers,

Kerry Lunney
INCOSE President 2020-2021

The Power of Connection

Papers, Panels, Tutorials Submissions: **November 14, 2021**

32nd Annual **INCOSE**
international symposium

hybrid event

Detroit, MI, USA
June 25 - 30, 2022

Call
for Papers

Call for Panels/
Roundtables

Call
for Tutorials

Future events

SEP
17-19

2021 Western States Regional Conference (WSRC)
San Diego, CA, USA
www.incose.org/wsrc/wsrc2021

SEP
23

9th Nordic Systems Engineering Tour 2021
Virtual Event
www.nordic-systems-engineering-tour.com

OCT
4-8

Great Lakes Regional Conference (GLRC)
Detroit, MI, USA (Live and Virtual)

OCT
22-23

2021 INCOSE New England Fall Workshop
Virtual event
www.neincose.org/2021-incose-ne-fall-workshop

OCT
28-29

EMEA Workshop 2021
Sevilla, Spain
www.incose.org/emeaws2021

NOV
17-19

INCOSE Human System Integration Conference 2021
San Diego, CA, USA
www.incose.org/HSI2021

JAN
29-Feb 1

Annual INCOSE International Workshop 2022
Los Angeles, CA, USA
www.incose.org/iw2022

MAR
24-26

CSER2022 conference on systems engineering research
Norwegian University of Science and Technology

JUNE
25-30

32nd Annual INCOSE International Symposium
Detroit, MI, USA
www.incose.org/symp2022

Notes from the Board

Lisa Hoverman, marcom@incose.net

The INCOSE Board of Directors (BoD) held their third quarter meeting remotely via Zoom, continuing the on-going global quarantine status. While the in-person meetings are very much missed, the camaraderie of this Board is strong. This BoD meeting focused on:

- Nominations and Elections
- Policy Review
- Contract Renewals
- Updates from the following committees, cross-cutting services, groups, and task teams:
  - Special Projects
  - Technical Operations/Standards
  - Budget/Finance – with a large focus on planning for the 2022 budget
  - History on INCOSE Fees
  - Marketing and Communications
  - IT Evolution and Initiatives
  - Outreach/Alliances; ARMS Overview
  - Sector Updates
  - Strategic Operations
  - Value Statements
  - STEM Working Group
  - Diversity, Equity, and Inclusion
  - Operations
  - Academic Council Updates
  - Board Top 20 Priorities of 2021 Progress
- The Board shared 2021 progress and upcoming work on from our Value Streams:
  - Events (specifically the 2nd virtual IS2021 and upcoming 2021 and 2022 events)
  - Membership (Individual and CAB)
  - Education and Training (General and Professional Development Portal Progress)
  - Products (SE Handbook V.5 and Vision 2035 in progress; Product Licensing and Recorded Offerings)
  - Certification (Online Testing Live)

Members of the INCOSE BoD on a Zoom Call during the INCOSE Q3 Board Meetings

Update from the Asia Oceania Sector

Serge Landry,
serge.landry@incose.net

As the Asia Oceania Sector Director, I strive to help the sector's chapters and aspiring chapters to be successful. In a few words, the chapter structure provides value to the members locally.

Top Sector Action for 2021—Helping Struggling or Inactive chapters

In continuing the work started last year, we identified two chapters as inactive with no more local leadership.

With volunteer help, we attempted a series of Virtual Cafés in both chapters with mixed results:

- In Taiwan, we were unsuccessful, and the Board subsequently voted to retire the chapter, a disappointing but not unexpected result. On a more positive note, potential new members can still connect with another chapter for local content rather than not at all.

- In Southern China, we connected with members and ran a series of virtual cafés. No membership lead exists anymore for this chapter, and we are starting to discuss the way forward with the Beijing Chapter (the only active China chapter).

One more chapter has struggled with rebuilding membership numbers. Despite this, the Korea chapter is active and helps with two local annual events. We are continuing discussions to see what other dedicated content and activities would entice more members to join.

Emerging Chapters

We are actively trying to officially set up two 'emerging' chapters:

- We have recognized New Zealand as an emerging chapter and are continuing the effort to ramp up the membership numbers

- Mongolia is spreading the systems engineering message and following the checklist for chapter creation

Looking forward, regional interest exists in Indonesia and Malaysia regarding systems engineering and potential chapters.
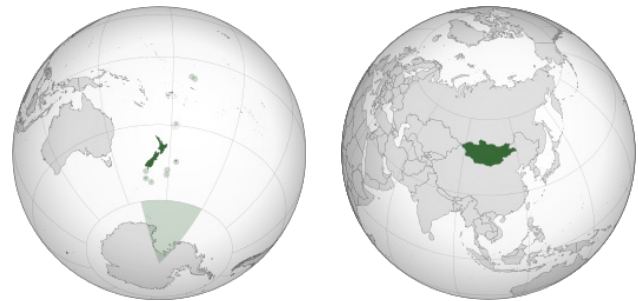
Chapter creation guidelines are available at www.incose.org/incose-member-resources/chapter-resources.

Membership Situation

The historical trend of a 10% individual membership increase remains despite the current pandemic's impact.

Certification continues to receive strong interest in the sector.

Sector 3 Individual Members
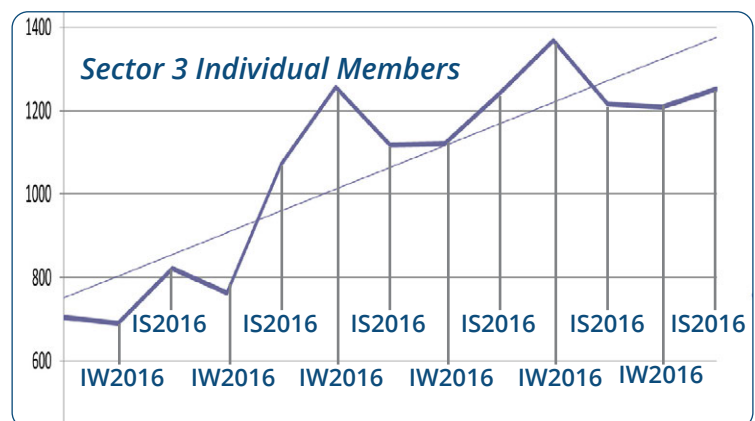
INCOSE IT: Moving Your Working Group or Chapter into the New Collaboration System

Barclay Brown,
barclay.brown@incose.net

As you have probably heard, we are implementing new collaboration capabilities in INCOSE based on Microsoft 365 Teams and Yammer. How do you take your current INCOSE Working Group or Chapter and bring it into the new system? Here is a rundown of the steps, and INCOSE IT is here to help:

- Identify the core leaders of your group and form a team on Microsoft Teams for them. For an INCOSE working group, this means the chairs and co-chairs. For a chapter, this is the chapter officers, directors, and the chapter board of directors. If any of your core leaders are not on the Microsoft 365 Teams system, contact barclay.brown@incose.net to help add them.

- Start using the team you created to manage the group activities. Teams allows for real-time chat dialog, persistent posting and reply conversations, simultaneous document editing and collaboration, and more.

- Form additional teams (or channels within your main team) for small groups of people actively collaborating on projects in your group. For example, if four people are collaborating on a Primer or SEBoK article, you can form a team for them. Anyone on a team can create new teams, and any team owner can create new channels in the team.

- Create a community on Microsoft 365 Yammer to build communication among your entire group and between your group and the rest of INCOSE. Start by creating the community and adding your leaders. Then add some posts and other resources, so the room is not bare when members drop in on your community.

- When you are ready, ask us to create accounts for all your members, granting them access to Yammer and your community. Those on Teams can use the same login for Yammer.

- Review the files your group owns, typically stored in INCOSE Connect, and decide which files the teams you created need. Move those files into Teams for easier collaboration. You can place files ready for distribution to the rest of the Working Group and the rest of INCOSE in the files area of Yammer. Once you move all files out of Connect, we can mark your Connect area "read-only" so no one mistakenly updates files there.

If you need help with any of these steps for your group, just reach out to barclay.brown@Incose.net.

IWCE
Connecting Critical
Communications

Conference: September 27-30, 2021
Exhibits: September 29-30, 2021
Las Vegas Convention Center
Las Vegas, NV

CONNECTING CRITICAL COMMUNICATIONS PROFESSIONALS TO CREATE A SAFER, MORE EFFICIENT AND MORE INTERCONNECTED WORLD

IWCE is heading back to Las Vegas this September 27-30, 2021!
Join the critical communications community for four-days of cutting-edge education, networking with industry leaders and exploring the latest solutions in the market.

→ Register with code **INSIGHT21** to unlock 20% off conference packages and free exhibit hall.*

iwceexpo.com
#IWCE2021

IWCE's
**URGENT
COMMUNICATIONS**

OMDIA

Brought to you by
informa tech

*Not valid for the ETA training courses & tests. Non-transferrable. Cannot be applied to previously paid registrations. Discount expires on September 24, 2021 at 11:59 p.m. PT.

Providing Value through Impactful Services

Don Gelosh, dsgelosh@wpi.edu
Richard Beasley,
richard.beasley@rolls-royce.com

Introduction

It is an exciting and challenging time for the INCOSE Services Operations area. The concept of a services organization is still somewhat new, but our services are a mixture of established and new. We cover three key value streams in Services Operations: Certification, Events, and Education and Training. An associate director leads each value stream.

Certification. This is a well-established and popular value stream, and there are many new developments, including:

- Remote online capability for taking the Systems Engineering Professional Knowledge Exam.

- Academic equivalency enables universities with qualifying courses to allow students to waive the knowledge exam. This program is very popular and enables INCOSE to positively influence the academic curricula in systems engineering. A recent count indicated over 1200 people requested the waiver.

- Piloting a competency-based equivalent assessment for the CSEP certification.

Events. Last year COVID-19 accelerated us into providing virtual events. The International Symposium 2020, International Symposium 2021, and International Workshop 2021 were far more successful as virtual events than we had hoped. The next challenges are:

- Moving towards hybrid events, starting with the International Workshop 2022. Even though we can return to in-person events, we do not want to lose the enhancement provided by a virtual capability.

- Establishing a series of mini-events.

Education and training. The major activity in education and training is developing and deploying the Professional Development Portal (PDP). The PDP is a comprehensive solution for systems engineers and other professionals who want to enhance their systems engineering knowledge and skills. The PDP service will provide access to:

- Self-Assessments based on the INCOSE systems engineering competency framework.

- Recommendations of appropriate professional development content materials and programs, provided by INCOSE and selected organizations, aligned with individual user needs.

- Quick references to certification, events, working groups, mentoring, the Institute for Technical Leadership, and other INCOSE offerings.

Professional Development Portal

We are developing the PDP service as an agile development project with a Minimum Viable Service (MVS) planned for the International Workshop 2022. It has been challenging to determine what we can deliver as the MVS—holding back the range of exciting ideas—while ensuring the initial deployment provides significant value. We are very excited to now have close to 1000 pieces of suitable and appropriate content for the PDP.

The MVS capabilities include:

- INCOSE products (webinars, tutorials, and SEBoK) reviewed and classified by the PDP Taxonomy—Systems Engineering Competency Framework competencies, Systems Engineering Proffessional experience areas, systems engineering domains for the International Symposia, ISO/IEC 15288 Systems Engineering Processes, and some general topics. This will be the metadata supporting the PDP catalogue browsing.

- PDP catalogue browsing capability of INCOSE products targeted at the awareness and practitioner levels as the Systems Engineering Competency Framework defines.

- A Google-based search of the INCOSE website.

- My Bookshelf for each member to individually store learning resources they reviewed, store items they found via searches to review later, and add individual notes to their diary.

Capabilities in future phases beyond the MVS include:

- Providing additional content such as INCOSE Products, recorded event offerings, and training material from other organizations.

- Providing access to the Wiley Hub for better search capability for INCOSE items on Wiley.
- Providing a recommender capability to recommend items based on the user's PDP profile.
- Providing more advanced My Bookshelf capabilities.
- Helping people find and contact willing and available mentors, coaches, and learning communities to guide their professional development.
- Adjusting existing INCOSE material to focus more on professional development goals.
- Linking to external learning resources and high-quality training providers.
- Commissioning learning resources to fill gaps in the professional development material currently available, particularly in introducing the systems engineering art and practice to those new to the discipline, including linking to the SySTEM Initiative for encouraging the systems mindset.
- Providing connections to INCOSE certification.
- Linking events and their content as learning resources to the PDP.

More Impactful Services

Services Operations has grown beyond just these three value streams. In response to COVID-19, we developed the Virtual Community Offerings to provide a service where INCOSE members can benefit from the diverse INCOSE community with informal engagement, discussion, and continued conversation; all conducted remotely and virtually.

System Exchange Cafés. We established the Systems Exchange Cafés as regular, informal meetings where those present use their interests to drive the conversation. Three separate sessions were available during different time slots, with the intention that anywhere in the world, there would be at least one, and ideally two cafés accessible during "regular" working hours. These cafés exploit Zoom's capability for a group conversation. The topic range covered has been broad—sometimes on pre-prepared topics (the cafés all started with a review of the INCOSE systems engineering definition), and sometimes on ad-hoc topics of interest arising from the conversation. We are looking to re-energise the cafés by looking for a wider range of individuals willing to host and facilitate the discussion. We are also using the new INCOSE Yammer tool to continue the conversation outside the café opening, prepare and set up the topics for future discussion, and generally promote and expand the conversations' buzz.

Conversations. We plan to develop a "topic of the month" (name to be finalized!) conversation covering various topics of relevance and interest to system engineers. This conversation will use a mixture of online reading, webinar presentations, online discussions using the Yammer tool, and live zoom panel question and answer sessions. We hope to cover a diverse topic range that will engage the interest (and comment or debate) of the INCOSE community.

We are only getting started

In addition to all the services described above, we are excited to develop a range of new, valuable, and engaging offerings to the members. The challenges we face include:

- Learning to crawl before we walk and walking before we run.
- Integrating several great ideas into a coherent strategic whole.
- Ensuring the services we provide work properly and truly provide value.

We see Services Operations as integrating the work of INCOSE and providing it via impactful services to both the INCOSE members and potential members. In this way, Services Operations contributes to the INCOSE vision of "A Better World through a Systems Approach."

Services Operations is one of the more rewarding things we have ever done in INCOSE as volunteers. It is great to see how much we can enhance INCOSE's true value. None of this would be possible without the outstanding contribution of the team of volunteers working tirelessly to deliver these ideas and services— our deepest thanks go to all of them.

IS2021 Strategy Sessions, INCOSE Director of Strategic Integration

Tom McDermott
thomas.mcdermott@incose.net

On 3-5 August, we completed the third virtual INCOSE strategy session event. We focused this one on the INCOSE International Symposium 2021 (IS2021). Once again, we had great support from INCOSE leaders and members. Thank you to all of the participants for donating your valuable time.

These strategy sessions aim to make sure we capture your ideas and needs into a strategic framework to drive real change in an open and transparent fashion. Each session produces data and recommendations we then present to the board of directors to inform our priorities and initiatives. We track recommendations that generate board actions via quarterly board meetings. The director for strategic integration maintains a strategy session recommendations and dispositions list that we continue to review at board meetings until we have worked or otherwise closed them all. In this way, the event lives on, and we consider your inputs in ways that drive tangible improvements to our member value.

This session covered three topics, split into two sessions to allow better participation from all our members and timezones. As we just completed the strategy session event, I can only summarize the events at this time.

Session 1a and 1b. Connecting systems engineers through professional development mentoring. INCOSE is exploring developing a mentoring matching capability for professional development, new members, and Empowering Women Leaders in Systems Engineering (EWLSE). INCOSE would like to provide a more proactive "introductory" service connecting mentors with mentees. This session first collected data on stakeholder needs and potential solutions, then discussed the mechanics needed to develop the capabilities and potential mentoring areas.

Session 2a and 2b. Data visualization strategies and tools for digital engineering. This session broadly discussed the challenges and gaps in today's methods and tools for visualizing complex system models and brainstormed potential advances in data management and visualization tools. INCOSE would like to explore a technical agenda to advance the state of the art and practice in data and model visualization and presentation. The session identified interested stakeholders and potential topic areas and products.

Session 3a and 3b. INCOSE in the southern continents. INCOSE has two chapters in Africa (South Africa and Tunisia) and three chapters in Latin America (Mexico, Argentina, and Brazil). This session explored options to boost chapters and members in these areas and general means to increase systems engineering awareness across these continents.

Overall, we had nearly 50 participants each in Sessions 1 and 2 and almost 30 participants in Session 3. I will summarize further outcomes from these sessions in future reports.

Looking back to the previous INCOSE International Workshop (IW) 2021 sessions, I am pleased to report we have established an INCOSE Science, Technology, Engineering, and Math (STEM) related initiative, which we call "SySTEM." We created this initiative directly from data generated at the IW2021 INCOSE STEM Investment Strategy Session. If you are interested in being part of that initiative, please contact me or Bill Chown, who has volunteered to chair the initiative.

New to INCOSE?
Choose Your Path: Technical, Leadership, or Change Agent

INCOSE New Member Engagement Team, nme@incose.net

If you are new to INCOSE, it can be a challenge to find your place. Sure, if you want to sit back, read *INSIGHT* and the Journal, and maybe come to a conference from time to time, great! However, INCOSE offers so much more to expand your knowledge, skills, and network, thereby enhancing your career. There are three main pathways to greater involvement in INCOSE: the technical path, the leadership path, and the change agent path.

First is the technical path. This is a great fit if there is a particular systems engineering aspect you want to help develop. The technical path centers around INCOSE's Working Groups—over 50 groups focused on a systems engineering-related area. See the complete list at www.incose.org/workinggroups (or type working groups into the new search box at incose.org) and reach out to one of the working group leaders to join. Working groups welcome everyone but are best for systems engineers already involved in an area who want to share their knowledge and help develop and expand the field.

Next is the leadership path. There are many opportunities to lead in INCOSE, offering you both a way to contribute to the organization's growth and development and build your leadership skills in a career-safe environment. Most leadership roles in INCOSE require no special skills or experience. You could start by offering to help lead your chapter, co-chair your working group, or lead an aspect of the next regional or international conference. You may also approach any INCOSE leader and volunteer to work in their area of responsibility.

Almost any group or activity in INCOSE welcomes new leaders. Another way to develop yourself as a leader is by applying for the INCOSE Technical Leadership Institute (www.incose.org/tli), a tuition-free extended leadership development program that develops you as a leader through education and coaching.

Then there is the road less traveled—the change agent path. Perhaps you see something in INCOSE that you could improve in a new way or an area related to systems engineering that is missing or not getting enough attention. Maybe you have a new idea and want to gather some like-minded people to pursue it. Being a change agent could mean starting a new working group, forming a new committee and proposing to work on something, or joining a working group or chapter and driving change from the inside. You could even run for an INCOSE Board of Directors position and bring change there. If you have a vision, there will be a way to pursue it. Change agents start most new INCOSE activities and initiatives.

Here is one more bonus path. Review the volunteer opportunities posted on the INCOSE Volunteer Opportunity Board (www.incose.org/vob) and see if any match your skills and interests. You can even describe your interest and let us see what might be available.

How do you get started? For any of these paths, the best way is to find a leader in INCOSE related to the area you wish to pursue and reach out to them personally by email or phone (remember the INCOSE Member Directory is available from within your user profile at www.incose.org).

For further inquiries or questions, please contact the New Member Engagement Team at nme@incose.net.

INCOSE

EMEA WS
Europe, Middle East, Africa
Workshop 2021

Virtual workshop
October 28-29, 2021

Sustainability in a world influenced by a Pandemic

Technical Program

Keynote Speakers

**Professor
Michael C Jackson**

Emeritus Professor at the University of Hull
and MD of Systems Research Ltd

Speaking topic: Extending the Scope
of Application of Systems Engineering
to Complex Sociotechnical Systems

Olivier de Weck

Professor of Aeronautics and Astronautics
and Engineering Systems at
the Massachusetts Institute of Technology (MIT)

Speaking topic: When is complex too complex?
Graph Energy, Proactive Complexity Management,
and the First Law of Systems Engineering

Juan Llorens

Professor at the Computer Science
and Engineering Department of
the Carlos III University of Madrid – Spain.

Speaking topic: Sailing the V
with an intelligent compass

Guy André Boy

Professor of Human Systems Integration
At CentraleSupélec, Paris Saclay University

Speaking topic: Human Systems Integration —
the Flexibility Challenge

Schedule

2 days workshop – 4 keynotes – 4 tracks – 16 presentations per day – sponsors presentations

EMEA WS – List of topics

- Risk Management
- Design a system that respects the environment
- SESTEM (system engineering, science technical and maths)
- Training & competencies
- Training & competencies (university of madrid)
- MBSE : Methods and Meta Models, simulation
- V&V
- System science
- Architecture
- Young Incose: Early career system engineers

- Agility
- Vision 2035
- Human Factors
- Automotive
- Service system
- PM-SE Integration
- Knowledge Management & Ontology
- Social system
- Requirement management
- Energy Systems

More information @ www.incose.org/emeaws2021

INCOSE Brasil Conference 2021

Carina Silva
carina.silva@incosebrasil.org.br

INCOSE Brasil is pleased to announce the **INCOSE BRASIL CONFERENCE 2021!**

Join us and enjoy this opportunity to expand your network of Systems Engineering professionals and enthusiasts. And of course, stay updated on what happens within the practice, society, industry, and academia!

18 to 22 October, 2021, *SAVE THE DATE.*

Best of all, it will be free, virtual, and accessible to everyone interested in participating.

Call for presentations are open: from 8 August to 17 September 2021 on the website: http://incosebrasil.org.br/conference/.

Be aware of the call for participation in the event for the general public, which will start on 27 September 2021.

Everyone is welcome! And don't forget to share with your contacts.

Sector Updates—Asia-Oceania

INCOSE India Chapter

Stueti Gupta
stueti.gupta@incose.net

In July 2021, the INCOSE India Chapter concluded its chapter elections, and we now have a new chapter committee 2021-2023. Please welcome all the elected members and extend your support.

Please see below for the newly elected committee member details.

- ***President—***Mr. Mudit Mittal (technology director, BlueKei Solution Pvt. Ltd.)
- ***Treasurer—***Ms. Ankita Jawale (systems engineer, Becton Dickinson)
- ***Secretary—***Mr. Prasanna Rammurthy (principal engineer—systems engineering, Collins Aerospace)
- ***Executive Committee Member—***Mr. Yogananda Jeppu (principal systems engineer, Honeywell Technology Solutions)
- ***Executive Committee Member—***Ms. Aparna Kansal (systems engineer, Boeing India Private Ltd.)
- ***Executive Committee Member—***Ms. Stueti Gupta (director, BlueKei Solution Pvt. Ltd.)
- ***Executive Committee Member—***Mr. Kalpesh Sawant (software project manager, ZF India)

Additional Chapter Activities

The INCOSE India Chapter organized 20 webinars with speakers and participants from all around the world. The chapter has three active local working groups,

- ***Model-Based Systems Engineering (MBSE) Working Group***—https://sites.google.com/view/mbse-lwg-india/home
- ***Prognostic and Health Management (PHM) Working Group***—email Prasanna R, venkatesanprasanna1@gmail.com
- ***Architecture Working Group***—email Dr. Anand, anand.ar@tcs.com

To stay updated on INCOSE India Chapter activities, you can follow us on:

- LinkedIn—https://www.linkedin.com/groups/2876451/
- Twitter—https://twitter.com/INCOSE_India

INCOSE UK Update
INCOSE UK Secretariat
publications@incoseuk.org

### Annual Systems Engineering Conference 2021—Booking Now Open

Those of you who attended will remember the success of the 2019 annual symposium, which took place at the Royal Armouries Museum in Leeds, Yorkshire. Therefore, it is our pleasure to announce we will return to this iconic building once more for the Annual Systems Engineering Conference (ASEC) 2021. Having been unable to host a physical event last year, we are working to bring you an extra special event this year. Furthermore, we are happy to tell you booking for this event is now open!

The good news is non-INCOSE UK Members can book at the INCOSE UK Member rate. Please contact events@incoseuk.org to request a booking code to receive the reduced rate.

This year's theme is "Creating Stability in Uncertain Times," within which we will explore the following subthemes: embracing change and transformation, building resilient organisations, developing technical skills for the future, and reflecting on best practices in unusual circumstances.

The programme is available on the event website and includes tutorials, professional development workshops, keynote speeches, presentations, a networking dinner, and more!
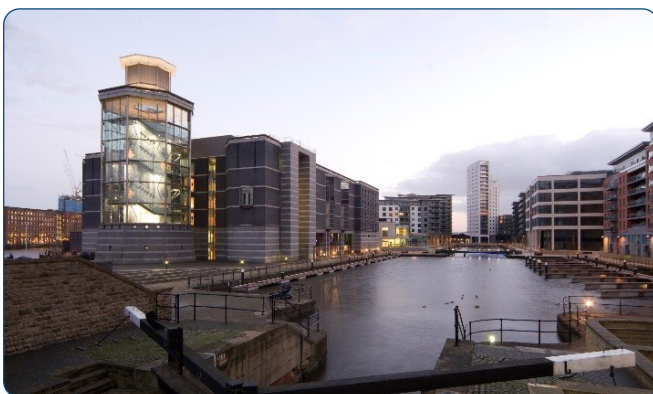
INCOSE UK looks forward to welcoming back systems engineers to this year's conference and being an enabler for face-to-face knowledge sharing and networking opportunities.

Endorsed Training Provider Event

From the 28th to the 30th of September, we will hold our first face-to-face Endorsed Training Provider Event at Marsh Farm Hotel, Royal Wootton Basset, Wiltshire.

Burge Hughes Walsh Ltd. and Scarecrow Consultants Ltd. will run the event. We summarise the course below. Each course will run for three days with up to 15 delegates each. The course cost for each delegate is £960 + VAT for members and £1,200 + VAT for non-members. The booking system, with full course details, is now open. Book your place here.

Three-Day Systems Engineering Fundamentals Course

This three-day course focuses on systems engineering concepts, principles, and practices to give attendees an understanding and specific knowledge to apply systems engineering to complex system design.

A Model-Based Approach to Systems Engineering

This course will benefit systems engineers, software engineers, software managers, quality personnel, and anyone involved with business or enterprise modelling. All course delegates receive a complete set of notes, summary sheets, and a copy of the book *SysML for Systems Engineering: A model-based approach 3rd ed*, by Jon Holt and Simon Perry.

## Hanna Leeson, the UK '2021 Top 50 Women in Engineering' Award winner

In the latest ePreview edition, we spoke to INCOSE UK member Hanna Leeson, a senior environmental engineer at BAE SYSTEMS, who just became one of "The 2021 Top 50 Women in Engineering" award winners.

Founded by the Women's Engineering Society in 2016, the WE50 awards is a UK event linked to International Women in Engineering Day. This event celebrates women in engineering and takes place on 23 June each year.

The awards celebrated the best, brightest, and bravest women in engineering, who recognize a problem, then dare to be part of the solution.

We asked Hanna some questions about the award, her career, and her aspirations for the future. You can read the full article in issue 85 of ePreview, available from the INCOSE UK website.
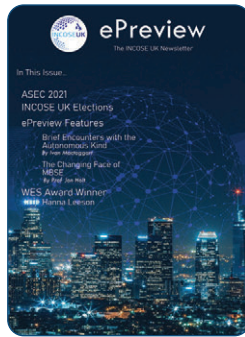
INCOSE UK Publications—eBooks now available

We are happy to announce select INCOSE UK Publication books are now available to purchase as eBooks in the INCOSE UK Online Store.

The eBook launch includes the best-selling "Don't Panic!" series. We published the first book, *Don't Panic! The Absolute Beginner's Guide to Model-Based Systems Engineering*, in 2017 as a paperback book. Since then, we have added

another three books to the series. INCOSE UK's first publication *Implementing MBSE Into Your Business—The Trinity Approach* is also now available in eBook format.

INCOSE UK's technical director, Jon Holt, said: "This is an important milestone for INCOSE UK as it opens our technical publications to the global market and contributes to our wider mission to promote systems engineering best practices across the world."

The books now available as eBooks are:

- *Implementing MBSE Into Your Business—The Trinity Approach*
- *Don't Panic! The Absolute Beginners Guide to Model-Based Systems Engineering*
- *Don't Panic! The Absolute Beginners Guide to Managing Interfaces*
- *Don't Panic! The Absolute Beginners Guide to Architecture Frameworks*
- *Don't Panic! The Absolute Beginners Guide to Architecture and Architecting*

eBooks and Paperbacks are available here.

Meet the Author Session is Now Available on YouTube.

We held our first "Meet The Author" session on the 2 of February 2021. Prof Jon Holt and Simon Perry, authors of *Implementing MBSE Into Your Business— The Trinity Approach*, spoke about their reasons for writing the book, their experience of writing it, and their thoughts and theories about MBSE in general. The event was informative and had good attendance.
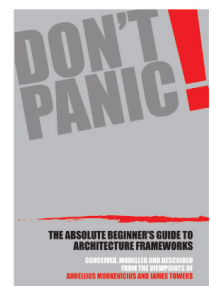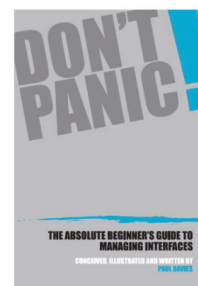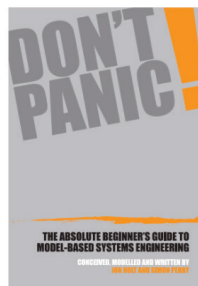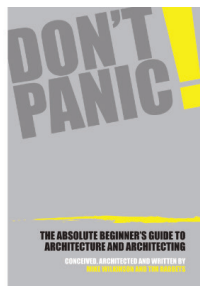
If you missed out on the live event, the session is available on the INCOSE UK YouTube channel.

Professional Development Online Sessions

- *10 November 2021—C/D/E Competencies Clinic.* This session will focus on the UK SPEC C, D, and E competencies and how systems engineers should map their experience to these when applying for professional registration. The session will be an open forum, including input from the INCOSE UK assessment team.

- *Professional Registration Webinar (UK Spec v4)—13 October 2021 and 15 December 2021.* Our regular INCOSE UK professional registration overview will cover how to apply and answer your questions on the professional registration process, including input from our assessor team and a recent INCOSE UK applicant.

To book a place for yourself or a colleague, please email profdev@incoseuk.org.

INCOSE UK Member Alan Harding inducted into the Worshipful Company of Engineers

We would like to congratulate Alan Harding on his recent induction into the Worshipful Company of Engineers.

The Worshipful Company of Engineers is a modern livery company of senior, leading engineers from industry and academia representing the full diversity of today's engineering. This fellowship aims to enhance the future engineering wellbeing of the nation.

Alan said, "As a passionate engineer, and a Londoner born-and-bred, I am excited to become a Freeman of the Worshipful Company of Engineers. I will use the platform afforded to me as a member of this prestigious organisation, and hopefully my subsequent elevation to the Livery, to continue to promote professional systems engineering as befits a past president of both INCOSE and INCOSE UK."

EMEA—Sector Updates

Cecilia Haskins
cecilia.haskins@incose.net

9th Nordic Systems Engineering Tour 2021

The next Nordic Systems Engineering (NoSE) Tour will take place on 23 September and will be virtual this year. We will have the same great line-up of international presenters as always. For more information, registration, and past tour reports visit https://www.nordic-systems-engineering-tour.com/.

This year Denmark, Finland, Germany, Norway, and Sweden organized the tour.

FYI
Information and Tools for Now

Call for Fellows Nominations Due 1 December!

Danielle DeRoche, info@incose.net

The Fellows Selection Committee is accepting nominations for new INCOSE Fellows submitted by INCOSE members until 1 December. INCOSE Fellows are individuals with significant verifiable contributions to systems engineering in industry, government, or academia. This award recognizes government and industry practitioners applying knowledge and contributing to systems engineering by designing and acquiring systems, researchers developing new knowledge and advancing theory, and teachers disseminating knowledge and developing the next generation of successful systems engineers. Further details are available here.

INCOSE
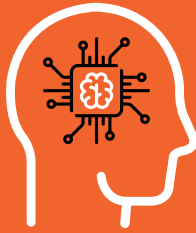
HSI2021
Human Systems Integration
Conference

San Diego, CA
November 17-19, 2021

Digital People ?

International Conference on Human-Systems Integration

Keynote Speakers

Nancy Cooke
Arizona State University

Speaking topic: Human Systems Integration for Human-Machine eaming

Nancy Leveson
Aeronautics and Astronautics at MIT

Speaking topic: Human Systems Integration through a Common Modeling Language

Thomas McDermott
Stevens Institute & SERC

Speaking topic: Systems Engineering in the Era of Human/Machine Teaming

Paul Salmon
University of the Sunshine Coast, Australia

Speaking topic: sociotechnical systems and HSI

Schedule

3 days – 4 keynotes – 2 tracks – 1 days workshop

Join us to learn more about
Human System Integration

More information @ www.incose.org/hsi2021

Call for Articles—*INSIGHT*
June 2022

Security in the Future of Systems Engineering. The Future of Systems Engineering (FuSE) is an INCOSE-led multiorganizational collaborative initiative pursuing INCOSE's *Vision 2025* and beyond. To accomplish this, the FuSE initiative encompasses numerous topics with active projects to shape the future of systems engineering. In 2020, a multiorganization workshop team identified 11 strategic foundation concepts appropriate for near-term development. An INCOSE International Symposium (IS) 2021 paper introduced these concepts with 11 one-page descriptions to instigate and inspire thinking and involvement in developing, describing, and practicing these foundational concepts. The focus is strategic intent, leaving ample room for various approaches.

IS2021 paper: www.parshift.com/s/210717IS21-FuseSecurityRoadmap.pdf.

Mission: These articles propose or expose strategies for developing, implementing, or practicing the foundational concepts.

Approach: This theme issue will accommodate articles specifically addressing one or more foundational concepts identified in the IS2021 FuSE Security Roadmap paper linked above. Authors may submit multiple offerings. A brief concept synopsis in table form is on the next page. Relevant articles include concept strategy development, implemented case study exposure, experimental implementation, and additional community instigation and inspiration. Many domains practice systems engineering in one form or another. These foundational concepts are domain agnostic, and some may have an early foothold in some domains worth exposing.

Schedule

- 15 Aug 2021: Call for articles issued
- 15 Oct 2021: (no later than preferred) Concept(s) addressed, working title, and one paragraph working abstract

- 15 Dec 2021: First (complete) draft submission
- 27 Dec 2021: Feedback comments returned on first draft
- 17 Jan 2022: Second draft submission, if appropriate, for review at INCOSE International Workshop 2022
- 29 Jan 2022: Live review: 15-minute presentation with 10-minute feedback at INCOSE International Workshop 2022 (in attendance or virtual)
- 15 Feb 2022: Detailed comments returned to authors for improvement, as appropriate
- 15 Mar 2022: Final draft submission, formatted for required style, with author-company release
- Apr 2022: INSIGHT editors may contact authors directly with copy-editing suggestions
- Jun 2022: INSIGHT publication

General Guidance

- Articles must speak meaningfully to systems engineers.
- The mission is the objective.
- These are not journal articles; the target is 2000-4000 words.
- Do not use the MS Word reference tool. Citations and references should comply with the Swinburne Harvard reference style. A descriptive guide with examples is available in the downloads section of the INCOSE IS website. Additional information is available at: http://www.swinburne.edu.au/library/referencing/harvard-style-guide.
- Style guide: MS Word, 12-point Times New Roman, single line spacing, indented paragraphs, with minimal or no (preferred) use of styles. We highly encourage graphics, and they do not take away from your word count.

- NO PDFs. Send submissions to rick.dove@parshift.com attached as an MS Word document. Include a title and author names and email addresses in the byline underneath the title. Also include an abstract and bio for each author.
- Updates to this call-for-articles will be available at www.parshift.com/t/2022Call.pdf

- The table below quickly summarizes the 11 concepts and conforms to the material in the IS2021 paper, except the General Barriers column, which was not in the IS2021 paper.
- This material is for your information and is not a mandatory prescription for how you may address one or more of the 11 concepts.

	Concept Title	General Problem to Address	General Needs to Fill	General Barriers to Overcome
1	Security Proficiency in the systems engineering Team	Insufficient knowledge of system security engineering at the systems engineering level; communication across knowledge and expertise boundaries.	System security and its evolution effectively enabled by systems engineering activity.	Disrespect between systems engineering and security people; perception of security as non-functional requirement; finding high level security expertise (architecture/strategy/empathy).
2	Education and Competency Development	Security education is not well integrated with engineering education, creating a skills gap.	Education at all levels focused on security of cyber-physical systems (CPS).	Perception of insufficient scientific/technical rigor for inclusion in engineering programs; engineering faculty security knowledge gap.
3	Stakeholder Alignment	Misalignment of security vision among stakeholders. Inconsistent appreciation for security among stakeholders.	Common security vision and knowledge among all stakeholders.	Stakeholder willingness to engage in collaborative convergence.
4	Loss-Driven Engineering	Traditional vulnerability assessments and risk/consequence models for security, safety, and related 'ilities occur too late in the systems engineering process.	Standard metrics and abstractions relevant to all system lifecycle phases.	Cross domain vocabulary/taxonomy differences; insufficient respect for potential leverage; solution- rather than problem-dominant security thinking.
5	Architectural Agility	Enabling effective response to Innovative threats and attacks.	Readily composable and recomposable security with feature variants.	Comfort with and acceptance of a dynamic security profile.
6	Operational Agility	Timeliness of detection, response, and recovery.	Ability for cyber-relevant response to attack and potential threat; resilience in security system.	Comfort with and acceptance of a dynamic response and recovery capability.
7	Capability-Based Security Engineering	Security strategies based on available solutions rather than desired results.	Top-down approach to security starting with desired results/value.	Difference between capability and features; solution-dominant thinking; trust that the outcome will be satisfactory.
8	Security as a Functional Requirement	As a non-functional requirement, systems security does not get prime systems engineering attention.	Systems engineering responsibility for the security of systems.	Cultural inertia that prioritizes system purpose over viability.
9	Modeling Trust	Systems Security has moved away from traditional focus on trust to a more singular focus on risk.	Reinvigorate formal modeling of system trust as a core aspect of system security engineering; address issues of scale with model-based tools and automation.	Entrenched risk-based practices and education; simplicity of communicating and comparing risk metrics; perception of security as a non-functional requirement.
10	Security Orchestration	Disparate security solutions operate independently with little to no coordination.	Tightly coupled coordinated system defense in cyber-relevant time.	Independent stovepipe solution tools; multiple disparate stakeholders; hesitation to explore interdependencies
11	Techno-Social Contracts	Insufficient detection capability for innovative attack methods [with dedicated purpose security components].	Augmented detection & mitigation of known and unknown attacks [with components collaborating for mutual protection].	Trust in the security of the approach; trust in the emergent result.

7th Annual Systems Engineering in Healthcare Conference

A <u>FREE</u> Virtual Conference

Dates: 29th October and 5th, 12th and 19th November 2021

Time: 1:00 pm to 5:00 pm EST

Attend: Free registration

"Advancing the Practice of Systems Engineering in the Healthcare Industry"

Tentative Agenda -

- **Friday, October 29, 2021**, 1-5 pm USA Eastern Time

    Session 1: Requirements Tools to Meet FDA Design Control Requirements

- **Friday, November 05, 2021**, 1-5 pm USA Eastern Time

    Session 2A: Systems Responses to COVID-19 and Future Pandemics

    Session 2B: User View on Requirements Tools

- **Friday, November 12, 2021**, 1-5 pm USA Eastern Time

    Session 3A: Linking SE Models with Simulations for Device Development

    Session 3B: System Approaches to Tracking Pandemic Responses

- Friday, November 19, 2021, 1-5 pm USA Eastern Time

    Session 4: Lean Healthcare Systems Engineering

For info visit us @**https://www.incose.org/hwg-conference**

LinkedIn group https://www.linkedin.com/groups/3853728/

INCOSE/SAE International Joint Membership Agreement

Andy Pickard, andrew.c.pickard@rolls-royce.com

INCOSE and SAE International are pleased to announce a joint membership model, where members of both organizations can pay discounted membership fees for each organization.

INCOSE will offer a 15% discount for joint membership.

SAE International will offer a 15% discount for joint membership.

Joint membership is available to regular, senior, and student members of INCOSE and SAE International, excluding:

- INCOSE associate members
- INCOSE associate or student members transitioning to full membership fees
- INCOSE members paying a multi-year discounted fee
- INCOSE members of INCOSE memorandum of agreement (MOA)chapters

MOA chapters are free to negotiate their own joint membership arrangements with SAE International. INCOSE central and our INCOSE-SAE relationship manager Andy Pickard can facilitate support for MOA chapter negotiations.

Qualification requirements for the appropriate organization will help determine membership type.

Those wishing to become joint members of INCOSE and SAE International must qualify to be a member of both organizations separately.

Joint membership will give access to the same benefits from each organization that individual membership now provides.
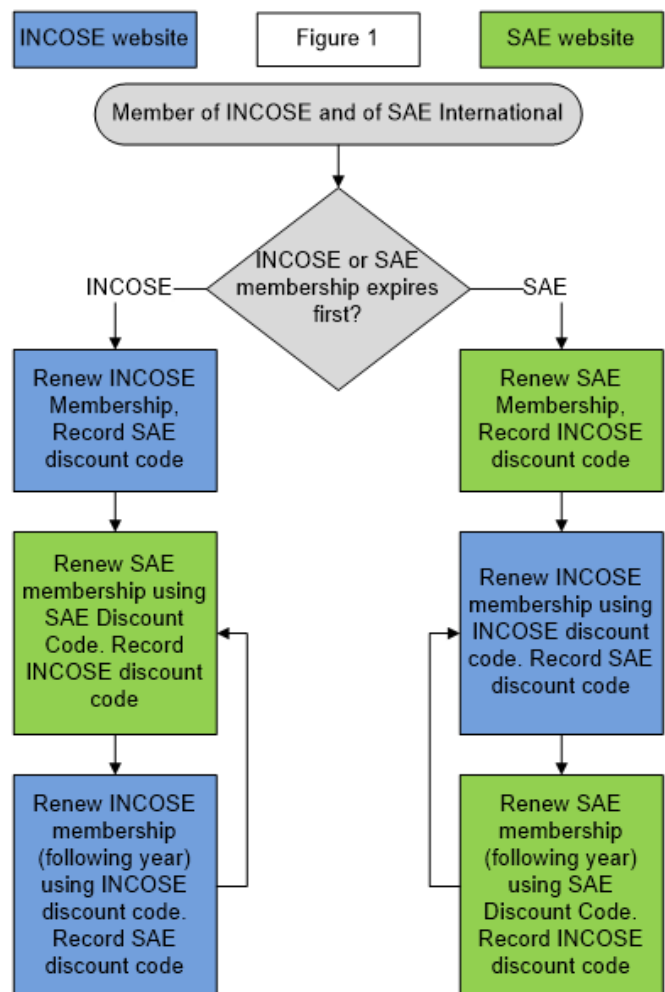
We intend the system to work as follows. If you are already a member of both organizations (see figure 1):

- When you renew your INCOSE or SAE membership—whichever comes first—you will receive a discount code for the other organization. As an example, if you renew your INCOSE membership first, you will receive a discount code from the INCOSE website for when you renew your SAE membership.
- When you renew your SAE membership, you will receive a discount on your SAE membership fee and a discount code for your next INCOSE membership renewal from SAE.
- When you next renew your INCOSE membership (in a year), you can use the discount code you received from SAE on your INCOSE membership fee. Then you will repeat the cycle for as long as you want to be a member of both organizations.

If you are already a member of one organization (in this example, an INCOSE member) but not the other, there are two ways you can use the discount codes (see figure 2):

Figure 1

INCOSE website — SAE website

Member of INCOSE and of SAE International

INCOSE or SAE membership expires first?

INCOSE → Renew INCOSE Membership, Record SAE discount code → Renew SAE membership using SAE Discount Code. Record INCOSE discount code → Renew INCOSE membership (following year) using INCOSE discount code. Record SAE discount code

SAE → Renew SAE Membership, Record INCOSE discount code → Renew INCOSE membership using INCOSE discount code. Record SAE discount code → Renew SAE membership (following year) using SAE Discount Code. Record INCOSE discount code

- When you renew your INCOSE membership, you will have access to a discount code for SAE membership. Then when you join SAE, you will use the code to receive the SAE membership discount, and you will receive a discount code for when you renew your INCOSE membership. When you next renew your INCOSE membership, you can use the discount code you received from SAE to discount your INCOSE membership fee. Then you will repeat the cycle for as long as you want to be a member of both organizations.

- If you are not ready to renew your INCOSE membership, but want to become a member of SAE, you can join SAE at the full membership rate and obtain a discount code for the next time you renew your INCOSE membership. When this happens, you will receive a discount code for when you next renew your SAE membership. Then you will repeat the cycle for as long as you want to be a member of both organizations.

If you have any questions or need help with the discount system, please contact:

- INCOSE: helpdesk@incose.org

- SAE International: membership@sae.org

Figure 2
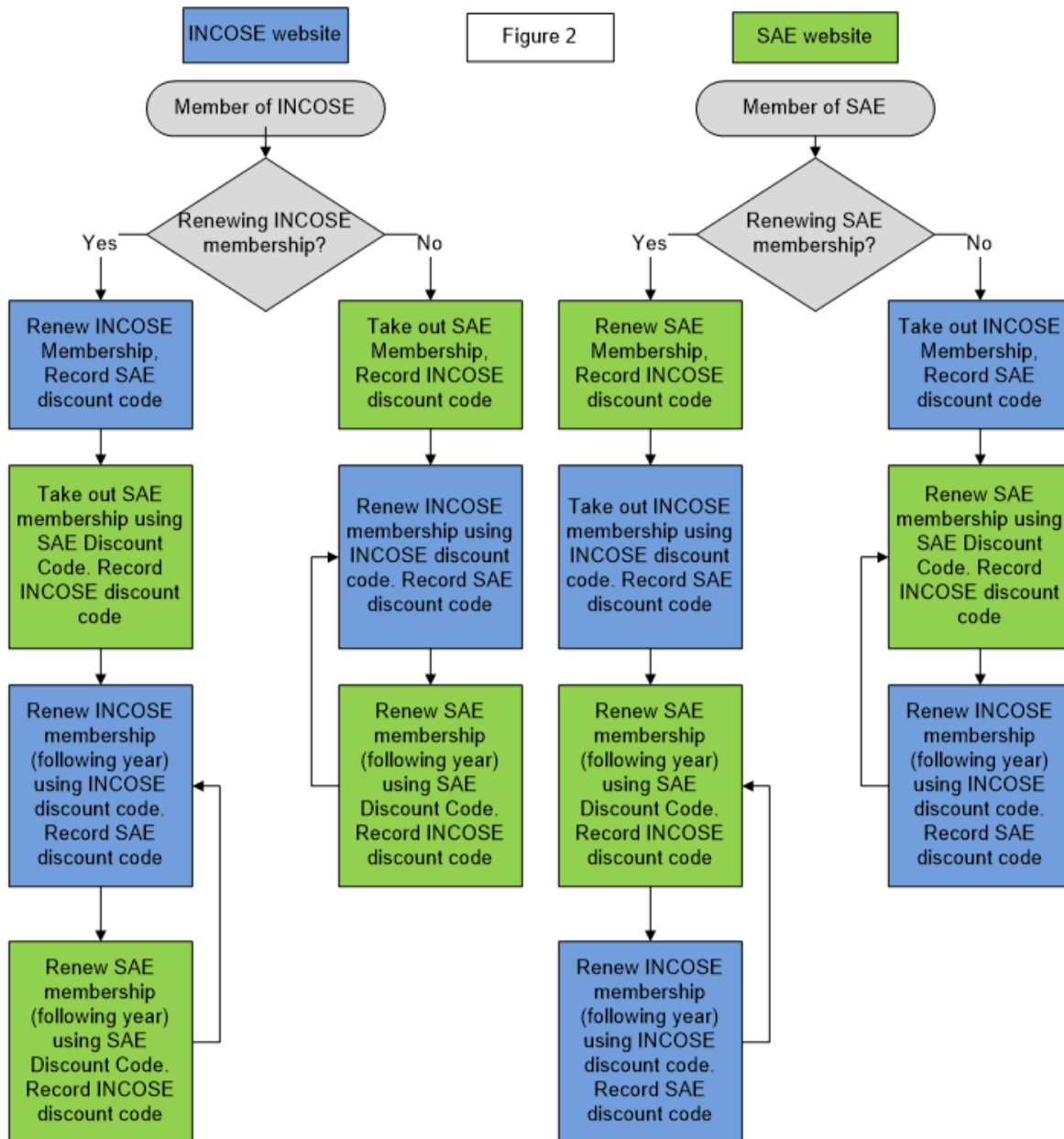
EWLSE Updates

Alice Squires, ewlse@incose.org

Empowering Through Adversity

Alice Squires
alice.squires@incose.net

The INCOSE International Symposium (IS) 2021 theme was "Accelerating Through Adversity."

- "Alexa, how do you define adversity?" Alexa says: "Adverse or unfavorable fortune or faith; a condition marked by misfortune, calamity, or distress."

- "Hey Siri, how do you define adversity?" Siri responds: "adversity | ədˈvərsədē | NOUN. difficulties; misfortune."

- "Okay Google, how do you define adversity?" Google responds with the same answer as Siri but adds a long list of examples starting with "resilience in the face of adversity."

For us invested in empowering systems engineering leaders, the question becomes how do we empower those currently in a state of adversity: facing difficulties, experiencing misfortunes, and in distress? Having experienced adversity in one form or another in our past, we understand adversity can result in negative feelings. The feelings not only involve what happened in the past but also focus on what happens in the present and project what we imagine will happen in the future. Imagine momentarily that your past adversity has been so pervasive and overwhelming, to an extent you cannot separate your past experiences from what is happening presently or what you expect to happen in the future. The question posed is how can we empower those who have experienced adversity to the extent they "live in adversity"? The challenge is to work together to find answers to this and related questions! This is the Empowering Women Leaders in Systems Engineering (EWLSE) mission—to empower our community members facing adversity, whatever challenges each of us may face.

For the INCOSE IS 2021, EWLSE supported two primary areas: the newly formed Diversity, Equity, and Inclusion team and Associate Director Maria Romero; and brainstorming a strategy for formally introducing a mentoring/

mentee initiative through the Professional Development Portal as part of the many services INCOSE offers. Stay tuned to hear more about these two initiatives!

For the latest news, please first see the article below on the newly published Indian Women in STEM e-book, which features many great stories from women of India. Also, the EWLSE publications team is finalizing the Letters to My Younger Self (LTMYS): How Systems Engineering Has Changed my Life as an online e-book. LTMYS will be available through the INCOSE EWLSE landing page (http://incose.org/ewlse) by INCOSE International Workshop (IW) 2022. The Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders book, which is part of Springer's Women in Engineering and Science series, is in the draft chapter review phase. Please email SELBook@incose.org to submit comments or suggestions for this book.

For upcoming events, if you missed the INCOSE IW 2021 "Level Up your LinkedIn and Grow Your Network" interactive workshop, you will have another chance to attend the workshop at the upcoming Western States Regional Conference. This hybrid conference will take place 17-19 September in San Diego, California. Stueti Gupta and Alice Squires will provide the virtual workshop from 10:30 a.m. to noon Pacific time (see: https://www.incose.org/wsrc/wsrc2021/program/program). EWLSE will once again support the Annual Society of Women Engineers (SWE) conference on behalf of INCOSE. The Women in Engineering 2021 conference (WE21) theme is "Aspire to Inspire" and will be in Indianapolis, IN, US, from 21-23 October as a hybrid conference. You can find EWLSE either in person or virtually at the SWE conference. Please let us know if you will be there!

And finally, EWLSE wants your stories and initiatives in building a world where women and men have equal representation as leaders in systems engineering. Please send your greetings, queries, comments, stories, and if we will see you at WE21 to ewlse@incose.org.

Stueti Gupta Shares Her Story in Indian Women in STEM

Alice Squires alice.squires@incose.net

Please join me in giving three cheers for Stueti Gupta, the Asia Oceania lead for EWLSE and INCOSE India chapter executive committee member, for being one of 50 women achievers featured in the newly published Indian Women in STEM e-book. This book features many great stories from women of India.
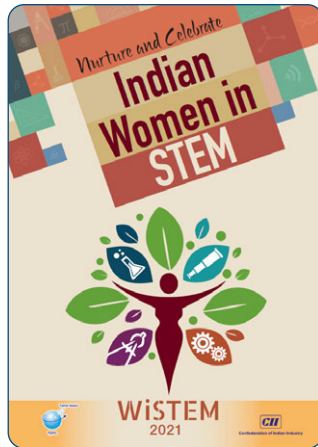
The Confederation of Indian Industry (CII) and Tamil Nadu Technology Development and Promotion Center, an autonomous CII society, compiled an e-book on Indian women achievers in STEM. The e-book has two main objectives, quoted from the book as follows:

- "To recognize and celebrate Women in STEM, who bring a unique vision and contribute to the advancement of their fields of specialization.
- To encourage the contribution of women leaders who are making a difference and encouraging and mentoring other women in STEM."

Please consider downloading the e-book from this link: https://www.cii.in/PublicationDetail.aspx?enc=j551+L24nFC/7GmA4rLprKKSGzebIkPIm45BHOdL29s=

We hope you enjoy reading through the many great stories, including Stueti's story where she talks about her career and the steps she took to inspire women in STEM. For example, one of Stueti's passages reads:

"Growth and comfort do not co-exist. We need to get out of our comfort zone to experience and learn new things. Being committed, stretching oneself will definitely unravel the potential within ourselves which we would not even have realised we had in our possession."—Stueti Gupta, Indian Women in Stem

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Stueti Gupta
Co-Founder and Director, BlueKei Solutions

Stueti is a budding entrepreneur who is set out to build a consulting practice in Systems Engineering, one of the pioneering organisation in India. BlueKei works with decision makers in corporate, private, PSU and government organisations to empower decision makers for efficient new product development using integrated engineering across multiple disciplines. Stueti Gupta (promotes) uses of systems engineering, systematic approaches and scientific methods to. BlueKei offers strategies and recipes to carry out integrated multidisciplinary engineering from the start of product development. It is ensured that existing practices are least disturbed to maintain design integrity, connecting the engineering data thread across the product lifecycle. That reduces rework and defects that could show up later and costly to correct.

Stueti is a purpose driven systems engineer, technology leader and STEM advocate. She has more than a decade's experience in architecture and analysis of complex off-highway equipment. She is passionate about systems-of-systems modeling to represent the behaviour of a system.

Stueti recalls developing a mathematical model for a logistics team to test their thumb rule. The team had experienced leaders with their strong mental models. Simulations developed by Stueti were backed by mathematical models enabled them to see how their thumb rules played out from day zero and for the next few years. Her most memorable moment is to follow her dream to be an entrepreneur. Her father would bring home magazines showcasing successful women entrepreneurs and business leaders, which always inspired her. Managing big teams and multiple functions in her career gave the courage to start a venture on her own.

Stueti's message to youngsters is 'be fearless, have high aspirations and big audacious goals'. They should challenge themselves and remove doubts from their minds. There is no substitute to hard work. If we do not put the right efforts, we will not get the right returns. They should do internships for field knowledge. Young professionals should do some voluntary jobs to make a difference to society. It helps them interact with people, which could be life changing.

Mr. Ratan Tata is her favorite role model. Her parents have also supported her career. Stueti has set aside time every year to mentor new graduates and women professionals. She has constantly been engaged with collegiate via SWE University affiliates as well as

Lamp lighting at Society of Women Engineers' Pune Program, 8th March 2020

Stueti Gupta with her 2nd SWE award, WE Local Engaged Advocate Award 2020

SAEINDIA. Stueti has also engaged in mentoring via a mobile based mentoring platform, MentorToGo, a non-profit organization. She is a trained facilitator of #IamRemarkable, a Google initiative to empower women and under-represented groups.

Stueti volunteers for the Society of Women Engineers (SWE). She received the SWE Distinguished New Engineer Award in 2016, the first awardee from India. In 2021, she received the WE Local Engaged Advocate Award for her significant contribution to the advancement of women in engineering. She is very active in the International Council on Systems Engineering (INCOSE) and served as the President of India Chapter 2017-2021. She leads Asia Oceania countries in one of the working groups, Empowering Women Leaders in Systems Engineering (EWLSE).

Stueti is an organized person and always calendars her commitments. Sunday evenings are for planning the week. She has a dual degree in B.E. (Hons.) Mechanical & M.Sc. (Hons.) Physics from BITS, Pilani, MS from Cornell University and M.E. Design Engineering from BITS, Pilani. Her message for youngsters:

"Growth and comfort do not co-exist. We need to get out of our comfort zone to experience and learn new things. Being committed, stretching oneself will definitely unravel the potential within ourselves which we would not even have realised we had in our possession." – Stueti

INSIGHT From the Editor-in-Chief

William Miller, insight@incose.org

We are pleased to present the September 2021 INSIGHT issue published cooperatively with John Wiley & Sons as the systems engineering practitioners magazine. The INSIGHT mission is to provide informative articles on advancing the practice of systems engineering and to close the gap between practice and the state of the art as advanced by Systems Engineering, the Journal of INCOSE also published by Wiley. The issue theme is the social dimensions of systems. We thank theme editors Randy Anway, Rick Dove, Erika Palmer, and the authors for their contributions that span multiple INCOSE working groups.

Several of the articles address security from the social dimension. Security is very much social! Your editor worked with the late Bob Morris decades back in time at Bell Labs. (Bob is the father of Robert Tappan Morris who unleased the first Internet worm in 1988 while a grad student at Cornell University.) The elder Bob collaborated with Unix operating system co-creator Ken Thompson (Morris and Thompson 1979, Password Security: A Case History, Communications of the ACM, 22(11): 594-597) on password security and performed social engineering to crack peoples' passwords by getting to know them and using known personal information. This led to rules for enforcing stronger passwords for accessing Unix time-sharing systems. Bob's skill in hacking led to his being authorized a "burglars license," that is, permission to crack into any computer at Bell Labs, by Bell Labs late beloved executive vice president Sol Buchsbaum; Bob's successful hacking into the payroll computer is particularly entertaining, a masterpiece of social engineering.

"Perceived Conflicts of Systems Engineering in Early-Stage Research and Development" by Michael DiMario, Gary Mastin, Heidi Hahn, Ann Hodges, and Nick Lombardo discusses the difficulty of introducing systems engineering to the research and early development process and the inclination perspectives of researchers, engineers, and managers. The article offers potential means to manage the cultural transformation of early adoption of right-sized systems engineering in ESR&D and reverse the attitudinal positions.

"Incorporating the Role(s) of Human Actors in Complex System Design for Safety and Security," by Elizabeth Fleming and Adam Williams outlines the system context lenses to understand how to include various roles of human actors into systems engineering design. Several exemplar applications of this organizing lenses are summarized and used to highlight more generalized insights for the broader systems engineering community.

"An Agile Systems Engineering Analysis of Socio-technical Aspects of a University-built CubeSat" by Evelyn Honoré-Livermore, Joseph L. Garrett, Ron Lyells, Robert (Rock) Angier, and Bob Epps presents the results of an exploratory case study on a university CubeSat team developing an earth observation satellite. Formal analysis of agile systems engineering helps improve success throughout the CubeSat lifecycle. The authors apply the INCOSE Agile SE WG decision guidance method for applying agile system engineering method to identify areas in which the project organization can improve to become more agile in three specific problem spaces: customer problem space, solution space, and product development space. The analysis process leads to valuable

insights about how the project organization of an academic project differs from that of industry. Additionally, the results indicate that areas such as stakeholder management and support environment can be factors that would benefit more from agile responsiveness.

"To Get Systems Engineers Interested in Social Dimensions, Give Them a Social Optimization Problem" by Tom McDermott and Molly Nadolski present a case study on student-led implementation trades for urban electrical microgrids that optimize community sustainability and resilience. In this case study, the students used formal models of non-traditional socioeconomic variables such as availability, energy burden on residents, and local jobs created. The case study presents a relatively straightforward process that considers social requirements and metrics in systems engineering design that are typically overlooked. The authors present this as both an example learning framework and a broader call to define and standardize systems engineering methods, processes, and tools for increased integration of social dimensions as functional requirements in future systems.

"Applying Behavioral Science to Agile Practice Evolution" by Larri Rosser and Brian Ganus states that certain approaches work well in agile realization of products and services is not accidental, but rooted in the study of psychology, sociology and human performance. For example, the "ideal agile team size" of 7 plus or minus 2 not only works but is supported by psycho-social theories such as the Ringleman effect, social channel capacity and short term memory limitations. Examples of similar relations between behavioral science and agile patterns abound – preferred planning horizons, methods of estimating effort and approaches to scaling agile all relate to our understanding of human behavior individually and in groups. This article explores such relationships with the intent to provide agile practitioners with information about the underpinning of practices, and social scientists with examples of how their work contributes to the improvement of agile practices.

"Detecting and Mitigating Social Dysfunction within Systems of Systems" by Mike Yokell elaborates on a means of assessing the managerial relationships between the organizations that own constituent systems within a system of systems (SoS), with a goal of detecting social dysfunction that could adversely affect operations. For each of the relationship types, or affinity options, tangible, actionable guidance is offered that could help mitigate the social and operational dysfunctions. Results from a case study are included to illustrate the application, detection, and successful mitigation of social dysfunction within a system of systems.

"The Emergent Properties of an Ethical Leadership When Aligned with the Systems Engineering Handbook and Code of Ethics" by Anabel Fraga analyzes the definitions found in the current Code of Ethics and Handbook regarding ethical leadership, its implications, and its application is explained and aligned to the ethical systems engineering idea. Also, examples of ethical behavior are introduced to explain emergent properties. It exemplifies that applying ethical leadership works in favor of the development of successful systems.

"Application of Model-Based System Architecture Process (MBSAP) to a Complex Problem with Social Dimensions: Utilization in Outpatient Imaging Centers" by Jill Speece and Kamran Eftekhari Shahroudi provides a comprehensive and visually understandable framework for system development. The primary social dimensions in outpatient imaging are the customer dimension, planning dimension, operations dimension, and technical dimension. Each of these dimensions has stakeholders with a diverse set of needs that must be well-understood and incorporated into the requirements. This paper presents an architecture for a system that utilizes all available exam time slots without a dependency on modifying patient behavior to prevent same day missed appointments. The MBSAP artefacts are the starting point for making the system a reality with stakeholders and finding the right balance between separate social dimensional measures.

"Bridge the Partisan Divide and Develop Effective Policies with Systems Engineering" by Jim Hartung describes a simple six-step systems engineering process for optimizing social, economic, and political systems. Second, he illustrates this process with two examples: (1) development of a nonpartisan tax reform proposal that balances the federal budget and addresses key societal problems without increasing the economic burden on taxpayers and (2) development of a nonpartisan plan for the United States to achieve the United Nations Sustainable Development Goals and address other urgent problems. Third, he discusses how lawmakers and policymakers can incorporate systems engineering into the lawmaking process. Many of the ideas presented here also apply to other countries.

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. For information about sponsoring INSIGHT, please contact the INCOSE marketing and communications director at marcom@incose.org.

Note From the Editor

Lisa Hoverman, newsletter@incose.net

It is hard to fathom how late in the year of 2021 it is! This year has had so much in it. The Q3 2021 Newsletter is being published as INCOSE and the world continuing to work through and with the COVID-19 Pandemic in many different ways, as vaccinations and variants have become available and more contagious. As we work through this 31st year of INCOSE in the 'new normal' we are encouraged by the work we see continuing in INCOSE, mostly remotely, but powerfully, at the Central, National, Chapter, and Individual levels. This Newsletter reflects all of that, and we hope you enjoy the read.

INCOSE went truly virtual in 2020 and we have emerged from that this year, with a recent on-person conference where INCOSE had a booth, with more in-person planned for this fall as hybrid events. The opportunity to meet in person again, when and where it is safe is terrific. INCOSE continues in serving our membership with improved IT offerings that make chapter meetings, symposia, conferences, cafés and membership communication more accessible remotely, and in some cases, to more systems engineers than ever before!

We work hard to make sure that systems engineers keep connecting, networking, and working together, and much of this is reflected in the quarterly updates from our CIO. This newsletter recaps highlights from our 2nd fully virtual International Symposium (IS) 2021—our 31st International Symposium(!), necessary as the world was still largely in a quarantine status.

We hope you fully enjoy this third issue of the Newsletter with highlights of INCOSE from Q3 of 2021 and the impactful work systems engineers continue doing together. As a reminder, we are many — more than 18000 systems people strong, spanning more than 70 chapters, 68 countries, with more than 120 Corporate Advisory Board Members and working in over 50 working groups on the state-of-the-art products, standards, and research that will continue to improve and keep

challenges of our times that apply to the Future of Systems Engineering.

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.net (note update from .org!).

We look forward to seeing you participating virtually as we network at, and present at, and gather 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 safe I really hope to see you at an upcoming online chapter meeting, a Systems Exchange Café, or an INCOSE conference!

systems engineering relevant and of increasing relevance and value to our world.

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 many upcoming and exciting end of 2021 happenings. We have upcoming powerful virtual chapter meetings, working group sessions, webinars and other initiatives of INCOSE reported on in this Newsletter. Important to this Newsletter are some great articles from practitioners— practitioners tackling both the real and grand

INCOSE Member Newsletter

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

Who are we? INCOSE is a 18,500+ member organization of systems engineers and others interested in systems engineering. Its mission is to share, promote, and advance the best of systems engineering from across the globe for the benefit of humanity and the planet. INCOSE charters chapters worldwide, includes a corporate advisory board, and is led by elected officers and directors.

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