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The International Council on Systems Engineering

MEMBERS NEWSLETTER

A better world through a systems approach

Q1 | March 2024

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Editor's Letter

Dear INCOSE Members,

As we embrace the opportunities and challenges of a new year, it's with great excitement that I present to you the latest insights and updates in our INCOSE Members Newsletter. From the visionary words of our new INCOSE President to the strategic pathways charted in our New INCOSE Strategic Plan, each article is a testament to the vibrant and forward-thinking community we've built together at INCOSE.

Steve Records, our Executive Director, shares a heartfelt message, reflecting on his inaugural year and expressing gratitude for your unwavering support. His letter underscores the collective strength, resilience, and unmatched passion within our community, setting a tone of optimism and unity for the future. As we delve into the diverse updates—from the International Workshop 2024 recap to the illuminating spotlights on our board members along with the progress across our chapters and working groups—we're reminded of the global and collaborative spirit that defines INCOSE.

This edition also marks milestones like the 20th Anniversary of SEP Certification and introduces you to the latest in systems engineering, including the transformative potential of AI and the SysML v1 to SysML v2 Transition Guidance Project. Your dedication and contributions fuel our journey towards excellence in systems thinking and engineering, aligning us more closely as One INCOSE, poised to navigate the complexities of the future together.

Thank you for your commitment and enthusiasm. Here's to another year of growth, innovation, and shared success!

Warm regards,
Honor A. Lind
Director of Marketing and Communications, EIC

"Coming together is a beginning. Keeping together is progress. Working together is success."

Henry Ford

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A Message from the New INCOSE President

As we reflect on the swift passage of the past two years, it's evident that this period has been marked by significant transformations. It has been my distinct honor to collaborate closely with Marilee Wheaton on the launch and forward momentum of pivotal developments within INCOSE.

Merely a year ago, we were proud to announce the appointment of Steve Records as our very first executive director. Since then, we've achieved remarkable progress in assembling a formidable staff team under his guidance. This accomplishment is poised to provide invaluable support to our volunteer leaders in the days ahead. Concurrently, we have embarked on articulating a clear INCOSE strategy and initiating the essential evolution of our board of directors, establishing dedicated task forces for these vital endeavors. The FuSE initiative, aimed at realizing the SE Vision 2035, has continued to mature throughout the year. We anticipate 2024 to be a year of further integration with our global working groups and the expansion of global collaboration partnerships.

The start of 2024 was marked by another record-breaking International Workshop in Torrance, where we had the opportunity to update the participants on the strategic and organizational progress. Today, I wish to reiterate our invitation for every member to contribute their insights and suggestions towards shaping INCOSE's future. Building on the success of IW23, we continued to highlight key cross-disciplinary themes while facilitating productive engagements among all working groups and committees to outline plans for 2024. Themes such as strategy, organizational evolution, the enhancement of safety in complex systems, the MBSE initiative, and the FuSE initiative were given prominence.

Looking forward to 2024 and beyond, in my view our priorities should encompass the completion and implementation of the first version of our Strategy, serving as a beacon for our volunteers and staff. I wish to underscore two specific goals: fostering the "One INCOSE" spirit and amplifying our global presence and influence.

The "One INCOSE" vision aspires for heightened collaboration between our chapters worldwide and the international body, advocating for a shared commitment

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to our strategy and enhancing our chapters' capability to express their needs and influence direction. Our engagement with MOA chapters, through numerous meetings and exchanges, stands as a critical pillar in realizing the ambitious objectives outlined in Vision 2035.

A significant milestone in our quest for global recognition and influence was reached on March 8 this year. Alongside Steve Records and our outreach director, Bernardo Delicado, I had the privilege of representing INCOSE at the World Engineering Day central event, organized by the World Federation of Engineering Organizations (WFEO) on behalf of UNESCO. At the WFEO executive council meeting, INCOSE was honored with recognition as a new international member, and I had the opportunity to address a distinguished assembly of global engineering leaders. This

affiliation includes the expectation of numerous synergistic endeavors in the future.

This edition of our newsletter vividly captures the breadth of our global activities, and I trust it will inspire many of you to join us on this exciting journey forward.

I eagerly look forward to meeting many of you at our events this year, particularly at our 24th Annual International Symposium in Dublin, Ireland. Returning to EMEA for the first time in 8 years since Edinburgh in 2016, and after the unforeseen disruptions of the pandemic, this event shall be a demonstration of high-quality technical content and our growing global footprint.

Ralf Hartmann
INCOSE President

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A Message from the Executive Director

INCOSE Members,

First and foremost, THANK YOU for your continued membership and support of INCOSE. INCOSE exists because of and for all of you!

It is difficult to believe, but as the first quarter of 2024 comes to a close, it dawned on me that I have been at INCOSE for a year. What a year it has been! As I reflect on my first year at INCOSE, there are many things that continue to encourage me with the strength and resiliency of our organization. There are also numerous opportunities that INCOSE has identified for our future. Our people continue to be our strength: the value the INCOSE network provides, the experience that exists within our membership, and the passion that drives our volunteers and leaders are unmatched. We intend to leverage this strength to grow our organization and its impact.

While we have more opportunities that we can pursue, I believe there are common themes to the where we will focus.

We will be intentional.

We will choose our path deliberately.

By focusing our efforts on a handful of tactics, we will create more value for you more quickly.

This does not mean that we will not be opportunistic. However, we intend on being agile enough to act on opportunities that we have not foreseen while pursuing the long-term goals we have identified.

We will be global.

Our membership is global and our impact is global. We will engage with organizations on a global scale to both leverage our strengths and grow in a targeted fashion.

We will align our activities, partnerships, and services to be more global than the past.

We will be aligned as One INCOSE.

Our members are more alike than different. The conversations, needs, and value drivers among our members are the same regardless of chapter affiliation, geography, or language and our service and operations needs to serve all members.

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Providing consistency, operational excellence, and a more impactful member experience will be prioritized.

I believe INCOSE finds itself in a unique and enviable position for us to both define and own our future. We all believe systems thinking and systems engineering are key to helping solve problems, and as more and more organizations search for better solutions, INCOSE will be there to assist.

Steve Records

"We will be intentional.

We will be global.

We will be aligned as One INCOSE."

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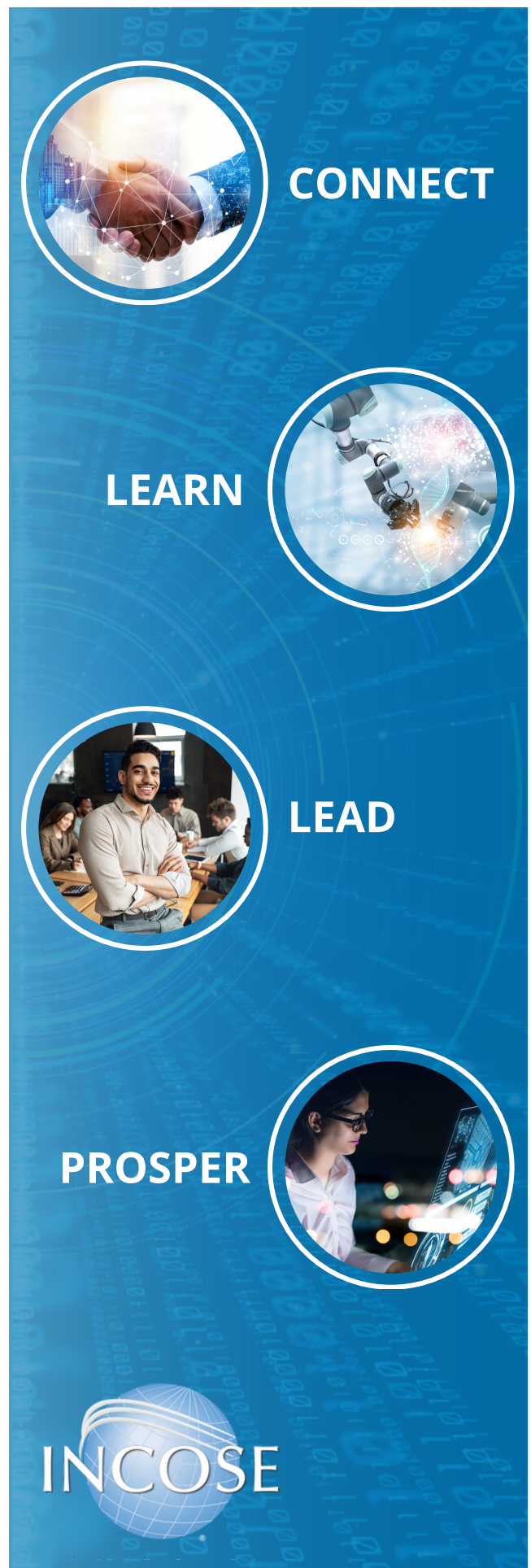
Towards a New INCOSE Strategic Plan

By David Long, Director for Strategy, david.long@incose.net

As we shared in the December 2023 newsletter, INCOSE is working towards a new strategic plan for our organization. Over the last year, we have conducted a SWOT survey (strengths, weaknesses, opportunities, threats) with INCOSE leadership to elicit their perspective on where we stand today and the environment within which we operate. To gain insights from our members, we conducted a member engagement survey which was highlighted in the December newsletter. To complement these internal views, leaders continue to hold structured interviews to gain external insights on INCOSE and the needs of the greater community from senior leaders across industry, government, and academia. Informed by these inputs and *Systems Engineering Vision 2035: Engineering Solutions for a Better World,* the Strategic Planning Committee has drafted v0.75 of the new INCOSE strategic plan.

During a special Town Hall at the International Workshop, we shared the draft version to elicit feedback and engagement on our path forward. The recording and materials from this session are freely available to all INCOSE members. If you would like to hear the framing of the draft plan and the future of INCOSE, log in to the INCOSE website, go to the Content Library, and search for "The Future of INCOSE" from IW2024.

The strategic plan is about INCOSE's future. We recognize the journey that has brought INCOSE to today, understanding both our strengths and weaknesses. We look outward to the needs of the community while looking inward to be realistic about what INCOSE's role can and should be in realizing the future. INCOSE is at its best when balancing targeted initiatives and organic efforts, so the strategic plan is more about aligning ourselves rather than directing members. It's about channelling our passion and energy, leveraging our resources in a focused manner along the chosen direction to maximize progress in pursuit of our vision and mission. That is our aspiration for the strategic plan.

INCOSE's Strategic Planning Committee

David Long
Director for
Strategic Integration

Ralf Hartmann
President

Mike Watson
President-Elect

Marilee Wheaton
Past President

Steve Records
Executive Director

Stueti Gupta
INCOSE India

Maz Kusunoki
INCOSE Japan

Udo Scheff
GfSE

Fabio Guimaraes
da Silva
INCOSE Brasil

Malcolm Thomas
INCOSE UK

In developing the strategic plan, the committee explored what INCOSE's role should be in the future. What can INCOSE do better than anyone else? What does success look like? How do we get there? As a result, we developed four objectives.

The objectives are goals that inspire and set direction. Supporting each are strategies that define multi-year approaches to achieve the objective and key results to define what constitutes success and measure our progress as we move forward. Annually, we will define and revisit supporting tactics to execute each strategy in pursuit of the greater objective. Though still in draft form, it is worth exploring the direction the strategic plan is taking. The four objectives and supporting strategies are as follows with key phrases bolded.

Become the World's Trusted Authority in Systems Engineering
Strategies
- Align roadmapping, initiatives, and strategic partnerships to **create the future of systems engineering** and mature its foundation
- Become a **standards publishing organization**
- Develop **pre-configured frameworks** of systems processes, methods, and tools suitable for problem archetypes to enhance the adoption and application of systems engineering
- Enhance **engagement between academia and practice** to improve coupling of advancing the state of the art and state of the practice in systems engineering
- Develop a **coordinated portfolio** of international, regional, and local events targeted to domains, topics, and competency levels
- Position INCOSE as **THE community** for systems leaders and executives

Grow INCOSE and the Systems Engineering Community
Strategies
- Promote the **why, what, and value** of systems engineering and those who apply it
- Repackage **foundational systems engineering** materials to reach new markets and application domains
- Attract individuals and organizations in **targeted markets**, geographic areas, and organizational scales
- Engage new members making individuals and organizations an **effective part of the INCOSE network from day 1**

Develop the Systems Engineering Workforce
Strategies
- Execute a **strategic publication and**

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curation plan addressing systems engineering principles, concepts, processes, methods, and tools

- Develop a **common set of products and packaging** (e.g., handbooks, guides, primers, videos, and models) to maximize discoverability, value, and impact of systems engineering knowledge
- **Tailor and translate** products for targeted application domains and geographic markets, where required
- Establish impactful services to address **competency and career needs** for systems practitioners throughout their career
- Create products and services to support the assessment and advancement of **organizational proficiency** in systems engineering

Strive for Operational Excellence

Strategies

- Advance a **ONE INCOSE** mindset unifying globally while tailoring locally
- Develop **aligned financial, resource, and operating models** in support of INCOSE's current and future objectives
- Develop **frameworks and supporting infrastructure** for efficient and effective chapter and working group operations
- Evolve and advance IT, communication, and marketing as **shared services** addressing member, leader, chapter, and organizational needs

While v0.75 of the strategic plan includes objectives, strategies, and key results, the tactics are intentionally missing. We are working to confirm the objectives and strategies before moving forward. Towards that end, we chose to share v0.75 as a draft that is sufficiently mature to review and respond to while being malleable enough to change in response to feedback. An open

call was made for all IW delegates as well as our global network of chapter, sector, and international leaders to share their feedback. In addition, we chartered two review teams comprised of members from around the world to elicit insight from internal and external voices; industry, government, and academia; and senior members and early career individuals. All reviewers were asked to share where the plan is incorrect, where it is too broad or too overreaching, and what it is missing that absolutely must be included. Those insights will help us advance from the draft plan a mature strategy that we will begin to align around and execute.

More than the Town Hall – IW 2024 Strategy Workshops

There was more INCOSE strategy at the IW than just the Town Hall. This year we used the hybrid sessions to explore the changing perspectives, expectations, and needs as seen by our chapter and working group leaders. Modes of engagement have changed notably over the last five years with the rise of virtual and hybrid. We have become an ever-more connected global community. The expectations of our members (and of all professional organizations) continue to evolve. As systems engineers, we recognize that systems must evolve as their context changes. The needs and approaches of the 1990s and 2000s are not optimally aligned for INCOSE today and tomorrow.

During the morning session, each group was asked to imagine a model suitable for our members and community in 2025 and 2030. They captured how we operate today – their primary activities; how we invest time, energy, and money; and what success looks like for their chapter or working group). Stepping away from the as-is, they imagined the desired and ideal states and what

resources, services, and support INCOSE needs to provide to make this possible.

Where the morning session looked inward to the operations and needs of the chapter or working group, the afternoon looked outward to the relationships with the greater INCOSE ecosystem. The objective was to better understand the interactions, interfaces, and dependencies – those that exist today and those that are needed to achieve the vision of tomorrow. Each group was challenged to identify what they need, what they can share, and how they want to be represented as we evolve INCOSE's organization and operations.

concludes on March 15. Those inputs will feed the Strategic Planning Committee and the INCOSE Board as we finalize the plan. Our intent is to finalize the objectives and strategies in April, maturing the key results and developing tactics for year one of the plan so that we can move to execution in mid-2024. As we finalize the plan, we want to disseminate it broadly enabling all parts of our organization to align around the plan, focusing our collective efforts with our operations reflecting our strategy. In doing so, we will also instantiate a process for regular updates embracing a living strategic plan.

Thanks to Nicole Hutchison and Kirk Michealson who led the working group session as well as Suja Joseph-Malherbe and Donna Long who led the chapter session. Most importantly, thank you to the many participants both in Torrance and around the world who engaged and invested their day to move INCOSE forward. The insights they shared will inform the emerging INCOSE strategic plan as well as the continuing evolution of our organization.

Stay tuned. It is an exciting time to be a systems engineer and a dynamic time for INCOSE!

What's next on INCOSE's strategic planning journey?

The review period for the draft strategic plan

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INCOSE IW

The INCOSE International Workshop is the premier collaborative systems engineering event where you can contribute your knowledge and experience to advance the discipline. Unlike INCOSE's annual International Symposium and other conferences, there are no paper, panel, or tutorial presentations. Instead, attendees spend 4 focused days working alongside fellow systems engineers who are there to make a difference. Systems Engineers at all levels and from all backgrounds are encouraged to engage in working sessions learning from one another as they advance systems engineering.

2024
Annual **INCOSE**
international workshop
HYBRID EVENT
Torrance, CA, USA
January 27 - 30, 2024

Corporate Advisory Board Highlights from the International Workshop (IW) 2024

By Mike Dahlberg, Ph.D., Corporate Advisory Board Chair

The Corporate Advisory Board (CAB) had great in-person and virtual participation at IW 2024. During the official CAB meeting, CAB representatives thanked the outgoing Chair, Ron Giachetti, for serving as the CAB Chair for the past two years. The incoming CAB Chair, Mike Dahlberg, and CAB Co-chair, Bob Bordley, were also introduced.

A number of key updates were provided on INCOSE initiatives, including the INCOSE Foundation, Technical Leadership Institute, and an update from INCOSE Marketing and Communications. During the CAB Meeting, the current CAB needs were reviewed, and the status of each was discussed. The CAB needs will be worked on further with INCOSE Technical Operations and will be reported on at the upcoming International Symposium 2024.

The highlight of the CAB session was a CAB Executive Leaders Panel that was moderated by the INCOSE Director for Strategic Integration, David Long. We were

fortunate to have great leaders from the industry to address digital engineering, their systems engineering workforce, emerging engineering opportunities, and the future of systems engineering. The panel members were Ms. Annika Meijer Henriksson, Saab Aerospace; Mr. Doug Ortel, Leidos; Mr. Marco Ferrogalini, Airbus; and Dr. Douglas Orellana, ManTech. Each panel member provided their unique perspectives, and the audience members took away many new ideas. We will conduct another executive leaders panel at IW 2025. Thank you to all CAB organizations for their continued support and participation. We look forward to our next in-person event at IS 2024.

Learn more and join the CAB

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INCOSE Services Update

By Heidi Davidz

During the International Workshop (IW) 2024, the INCOSE Services team worked to advance each of the individual services in a variety of meetings and member sessions. In the current INCOSE structure, INCOSE Technical Operations (TechOps) has responsibility to develop technical content, and the INCOSE Services organization has responsibility to deliver that content to members. Shown in the graphic below, current services in this structure are Events, Certification, Education and Training (including the Professional Development Portal, PDP), Technical Leadership Institute, Community Offerings (including Calling All Systems Webinars, Cafes), Mentoring, SE Lab, and Content Library. The objective is to "provide value through impactful services." To enhance that value and impact, a key focus in 2024 will be improving integration between SE Vision 2035, Future of Systems Engineering (FuSE), TechOps, and the various INCOSE Services. Some services will be receiving additional professional staff

support in 2024 to aid professional delivery and to assist volunteers.

Through the INCOSE Content Library, IW2024 presentations and recordings were available online within days of the event. An SE Lab status was given, and several of the vendors provided more in-depth explanations of their tools at a vendor spotlight session. Mentoring Services held a Community of Practice meeting and a Mentoring Service Open House. Discussions were held on next steps and integration of Community Offerings. The Technical Leadership Institute held a dinner and a workshop on intercultural communications. New polo shirts were distributed. There was a PDP and Competency Working Group workshop on conducting a competency self-assessment in the PDP. The PDP now has 1,440 learning resources. Certification held a hybrid session on how to apply for Academic Equivalency, along with two certification exams. In-person sessions on how to apply

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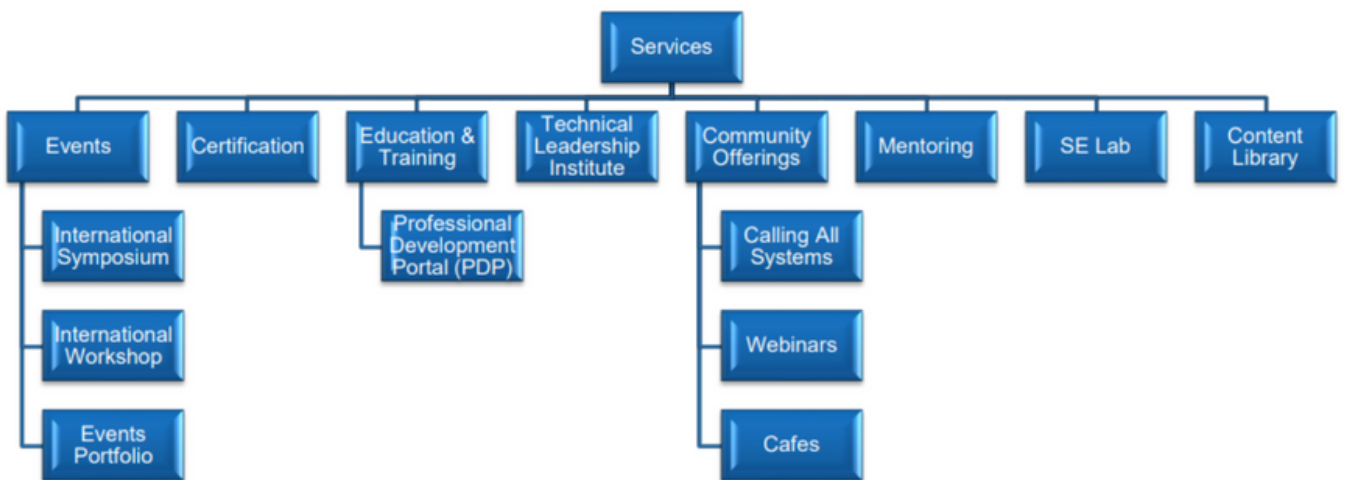
for ESEP and how to apply for CSEP were also provided, and a SEP lunch event was held. Events worked with TechOps on the International Symposium (IS) 2024 program. There was an Events Portfolio meeting to discuss the global portfolio, along with an Events Committee stakeholders meeting.

We encourage you to utilize the benefits included in INCOSE membership, and we look forward to continuing to enhance the value and impact these services provide to you in 2024!

PDP
PROFESSIONAL DEVELOPMENT PORTAL

Enhance your systems engineering knowledge and skills with the Professional Development Portal (PDP)

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Technical Operations (TechOps) at IW

By Olivier Dessoude

The Technical Operations (TechOps) community had a productive and successful International Workshop (IW) this year! With record-breaking attendance from around the world, virtually and in-person, the TechOps community was able to share valuable knowledge with keynote addresses and make effective use of time during working group sessions.

Congratulations to all the speakers and contributors, with a special mention to Duncan Kemp and Meaghan O'Neil for the Safer Complex Systems cross-cutting theme.

There were multiple engaging sessions on human-robot interaction and Artificial Intelligence (AI), including Hortense Gerardo's performance lecture, "On Guard | En Garde: Beyond Reliability Toward Trust in Human Robot Interaction (HRI)," and the associated Robot Cabaret: An Installation on Embodied Interaction in Humans and Machines session. Stay tuned to the TechOps community for more on the applications of AI and especially large language models and their applications to systems engineering.

There was a grand total of 87 Working Group (WG) meetings that occurred during IW, in addition to the networking lunches and WG Marketplace. Individual WGs were able to discuss and work on current projects and focuses, as well as plan for the upcoming year. There were also collaborative sessions across WGs, including the Multi-Working Group Summit for Infrastructure Domain

Applications.

Lastly, great progress was made on FuSE, including planning the first deliverables of the project, which will entail position papers released by INCOSE.

TechOps is looking forward to meeting you all at IW25 in beautiful Seville, Spain.

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INCOSE Foundation

By Dorothy Benveniste, dorothy.benveniste@incose.net

What if you could change the world by supporting the advancement of systems engineering? That is the goal of the INCOSE Foundation, a non-profit organization that funds and promotes programs that enhance the practice and profession of systems engineering.

The Foundation launched the SE Global Member Project in 2023, which works with universities in geographic areas where the cost of INCOSE membership is beyond economic reach. In 2023, the INCOSE Foundation onboarded faculty and students from two universities in Africa – The University of Nairobi, Kenya and the University of Lagos, Nigeria. The Foundation and INCOSE sponsor Academic Council Membership and enable over 300 African students at both universities to become Associate Members. The Foundation's 2024 focus includes strategies to expand to Latin America and Asia.

The future is extraordinary and challenging. The Foundation believes that the SE Global Member Project will provide access to INCOSE publications, webinars, events, and networks to engineering students, faculty and practicing professionals in underserved areas of the globe.

Holly Witte announced her retirement at IW2024 and shared these parting words: "What a wonderful sendoff at IW2024! Thank you to all my INCOSE friends made over these 15 years. It has been an experience I won't soon forget. I am throwing up raffle tickets in glee because of the money we

raise at Soiree and the support the CAB and INCOSE Chapters show us each year. Thank you!"

The Directors thank all supporters for their generosity and trust. 2024 INCOSE Foundation Board Members, led by Chair Dr. John Snoderly, are Jim Armstrong, Ph.D.; Regina M Griego, Ph.D.; Jon Wade, Ph.D.; Larry Strawser; Tyrone Theriot; Leroy Hanneman; Suja Joseph-Malherbe; Stephen Cook, Ph.D.; Robert Stow; Dorothy Benveniste, Managing Director; Holly Witte, Managing Director Emeritus; and Christine Kowalski, Operations Manager.

If you are interested in supporting the INCOSE Foundation and its programs, please visit our website, follow us on LinkedIn, or contact us directly. Together, we can shape the engineering future workforce, elevate the systems engineering community, and advance the public good.

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INCOSE honors standout members with 2023 Working Group Awards

By Chase S. Wilkinson

Systems engineering is a kinetic field, always bubbling with creativity, innovation, and progress. As another year of promise and excellence is underway, INCOSE has recognized stand outs from 2023 with the Working Group Awards.

Teamwork is at the forefront of some of INCOSE's greatest successes. The groups honored below showcase the pinnacle of team driven success.

The 2023 Collaboration Award was earned by the Project Management-Systems Engineering (PM-SE) Integration Working Group. Members worked together to understand sources of tension between project management and system engineering groups sought to alleviate those sources of friction. The team continues their seeking to understand how best to bridge the understanding between project management and engineers. The PM-SE Integration Working Group co-chairs are Tina Srivastava, John Lomax, Jean-Claude Roussel, Samuel Boutin, and Mark Kauffan.

The Joint Translation Working Group of the German and Swiss Chapters took home the Outreach Award. Chairs Ruediger Kaffenberger and David Endler accepted the award. Their working group spent the past two years translating INCOSE's key sourcebook, the INCOSE Systems Engineering Handbook Version 5, into their group's native languages.

The Competency Working Group, headed by chair Clifford Whitcomb and co-chair Lori Zipes, earned the Achieving the Systems Engineering Vision Award. The team was honored for their update of the Systems Engineering Competency Framework — an assessment and guide for gauging the knowledge of members and shaping further systems engineering education.

The Sustained Performance of 2023 was awarded to the Requirements Working Group. The RWG has been a vitally active part of INCOSE since the 1990s. Always at the vanguard for practices, education, and innovation, the team has consistently pushed for engagement throughout the INCOSE community through a wide array of topics and mediums. The group is chaired by Louis Wheatcraft and co-chaired by Tami Kratz, Michael Ryan, and Kevin Orr.

Amidst these outstanding teams, there is also space to recognize individual acclaim through this year's Outstanding Service Awards. Recipients include Omer Ertekin, Anabel Fraga, Jean-Luc Garnier, Erik Herzog, Tami Katz, Artis Riepnieks, David Shrunk, and Jessica Tucker.

It is through the collective efforts of everyone honored and the entire INCOSE team that INCOSE has seen a few select products truly thrive in 2023. This year there were two recipients of Product of the Year: the Systems Engineering Handbook Fifth Edition and the Systems Engineering Competency

Assessment Guide.

This handbook is a culmination of knowledge and represents the foundational sourcebook for all of INCOSE. This new edition was crafted by a dedicated group of volunteers composed of Dave Walden, Thomas Shortell, Gary Roedler, Bernardo Delicado, Odile Mornas, Yip Yew Seng, and David Endler.

Also honored as part of the Achieving the Systems Engineering Vision Award, the Systems Engineering Competency Assessment Guide stands as a benchmark tool for the society. This award honors the hard work of editors Clifford Whitcomb, Lori Zipes, and Ian Presland.

The Professional Development Portal, led by Don Gelosh, earned the Service of the Year award. A nexus of education, training and support, the PDP connects the global framework of INCOSE in staggering new ways. It stands as the culmination of all of the efforts listed above. A landing ground to access all the tools awarded and connect with the greater INCOSE community.

Innovation never rests and it is through the efforts of society members like those awarded this year that continue to drive INCOSE forward into the future.

STAY TUNED FOR THE YEARBOOK LAUNCHING AFTER IS 2024

INCOSE
A better world through a systems approach
Recognition & Awards Yearbook
2021-2022

INCOSE
International Council on Systems Engineering
A better world through a systems approach
AWARDS & RECOGNITION YEARBOOK 2023

34th Annual **INCOSE**
international symposium

hybrid event

Dublin, Ireland
July 2 - 6, 2024

WHAT TO EXPECT AT #INCOSEIS 2024?

Discover an overview of what's lined up at the premier systems engineering international conference:

- Monday 1 July - Welcome reception for first time attendees
- Tuesday 2 to Thursday 4 July - Networking opportunities in the exhibit hall
- Tuesday 2 to Friday 5 July - Diverse technical program + inspiring keynotes
- Thursday 4 July - Official dinner
- Saturday 6 July - Choice of tutorials

Dates
Tuesday 2 July –
Saturday 6 July, 2024

The Venue
The Convention Center Dublin
Spencer Dock, N Wall Quay
Dublin, Ireland

TECHNICAL PROGRAM

- **5** days - **6** tracks
- **239 +** Papers, Presentations on Systems Engineering
- **4** Inspiring Keynote Speakers
- **30** Countries Represented
- **22** Application Domains
- **40** Topics Represented
- **6** Panels
- **7** Tutorials

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Seize the opportunity to gain recognition for your organization among Systems Engineers from all around the globe: before, during and after the event. You'll find a choice of Platinum, Gold, Silver, Bronze, and Academic packages tailored to your needs. Register now to pick your preferred spot in the exhibit hall!

REGISTRATION OPENS IN APRIL

☑ **Sign up before 19 May to enjoy the early fee:**
Member: In-person: $1,750 - Virtual: $650
Non Member: In-person: $2,275 - Virtual: $825
Senior Member: In-person: $1,195 - Virtual: $475
Student member: In-person: $650 - Virtual: $225

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☑ Reserve now at our selection of hotels, just a few minutes' walk from the venue.
You'll benefit from negotiated group rates until 28 March (or until all rooms are sold out).

INCOSE

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Stay tuned for more! www.incose.org/symp2024

#INCOSEIS - Join the conversation

Future of Systems Engineering (FuSE) Initiative

The Future of Systems Engineering (FuSE) Initiative aims to engage and inspire the systems engineering (SE) community by realizing INCOSE's SE Vision 2035 to sustain the future of SE. FuSE refines and evolves the SE Vision 2035 across competencies, research, tools and environment, practices, and applications. FuSE identifies critical gaps towards vision realization and initiates and supports relevant actions. In addition, FuSE fosters involvement and collaboration within and outside of INCOSE, while it also educates, shares success, and expands SE. The roadmap for realizing the vision is structured into four streams: 1) Vision & Roadmaps 2) Foundations 3) Methodologies 4) Application Extensions.

At the INCOSE International Workshop (IW), FuSE presented 2023 outcomes and its 2024 project portfolio. The 2023 FuSE outcomes centered around the global SE narrative for the future of SE. Last year was a year of globe-trotting and data collection for FuSE as it brought together stakeholders from around the world in workshops designed to highlight global innovation in SE practice and research. From emphasizing the importance of demonstrating the value of SE in a dynamic environment, to highlighting the need for scientific recognition and heuristic-based approaches, advancing practices, methods, and tools for effective engineering of systems, and calling for the integration of social sciences and soft systems, each stream plays a crucial role. The community feedback has been

instrumental in guiding these conclusions, emphasizing the need for continuous engagement, communication, a unified language in SE, transformation and behavioral change, and collaboration.

For 2024, FuSE will continue its journey with projects such as position papers on sustainability and asset management that are in line with the insights from the 2023 workshops for the Application Extensions stream. Sustainability has been a recurring theme in our discussions, with a focus on grand challenges, climate change, and sustainable transportation. The formation of a dedicated working group within INCOSE to focus on sustainability further validates this alignment. Similarly, the selection of asset management for the 2024 paper is backed by insights from events involving participants from both INCOSE and the Asset Management Council. The Methodologies stream's focus on a position paper on Artificial Intelligence (AI) reflects the fast-moving field of action. AI can help us focus on the right methods, streamline, and simplify them, thereby increasing effectiveness and leading to behavioral change. This aligns with the three key findings shared in the reports: focusing on the right methods, leading to behavioral change, and further developing the methods themselves. The Foundations stream will contribute a theme issue in Insight Magazine on Elegant Systems and a "Cheat Sheet" to define key SE terms and concepts. These products directly address the directions we have discussed in the foundations stream

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workshops – heuristics, ontology, and education. The Vision & Roadmaps stream will hold horizon scanning workshops with industry, government, and academia to maintain focus on the already identified need for action, concerning continuous engagement, communication, and demonstration of the value of SE.

FuSE is realizing the Systems Engineering Vision 2035

Find out more at incose.org/fuse

Proceed with Intent: AI for the DEI Landscape

By Federica Robinson-Bryant

The application of artificial intelligence (AI) was abundant at this year's International Workshop. While AI continues to prove to be an extraordinary and accessible tool, one session aimed to explore the utility of the technology in the mission of improving diversity, equity, and inclusion in the pursuit of a better world via systems approaches. AI has revealed opportunities to reduce the time and resources required to analyze large datasets, uncover patterns, and tailor solutions that make information more accessible to people, including those with disabilities and otherwise marginalized communities.

The first act of the newly named INCOSE Assistant Director of Diversity, Equity, and Inclusion (DEI) was to co-lead a reflective workshop with EWLSE founder Dr. Alice Squires. "Empowering Women Interactive Workshop on Persistence in Leadership" encouraged attendees from around the world to self-identify at various levels of leadership proficiency and openly participate in exercises to actively reflect and share their personal and professional experiences. DEI-EWLSE is analyzing participants' written reflections on enabling and inhibiting factors affecting the decision to persist in systems leadership. More information will be available soon!

Yet, the more immediate observation was the protrusion of bias in the imaging output generated by AI when asked to depict diversity, equity, and inclusion of strong

Photo: Collage of Early AI Output of Strong Women Leaders in Technical Leadership

women leaders in engineering systems. Commonly used AI packages like DALL-E, Playground, Leonardo.AI, and 123RF were challenged to generate representative photos and art. Despite the usage of carefully crafted combinations of keywords to require cliched characteristics of various groups in each generation, the task of capturing the group's sense of DEI representation using AI tools proved quite difficult.

Participants expressed several forms of discontentment with the images uncovered:

"Why doesn't she look anything like me?"

"Why is she dressed in such a provocative way [ex. heels, slits, visible cleavage]?"

"Is there a reason why a powerful female leader is an anatomically 'perfect,' white, young lady with long, flowy hair?

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"Did we input the wrong prompt?"

"How many tries did it take to get to *that*?"

Hmmm.

Can AI be biased in its understanding of diversity or women in leadership roles?

Short answer: Yes.

Human understanding of the scope of diversity, facets of inequity, and the needs for inclusivity are still evolving. As a society, we must be intentional in acknowledging where gaps exist to craft a path forward.

How do we enhance AI's ability to depict DEI?

> **Recommendation.** We must ensure a diversity of perspectives, experiences, and thoughts among AI systems development, deployment, and sustainment teams.

How do we mitigate inherent bias that perpetuates and amplifies existing inequities?

> **Recommendation.** More careful data selection and analysis are needed to mitigate bias in AI algorithms, data sets, and training.

How do we apply human oversight to improve the output of AI?

> **Recommendation.** We must build and leverage our own understanding of DEI to intervene effectively and foster the development of informed prompts that impose certain features and dynamics in its rendering.

Using very lengthy and specific prompts, we were able to generate images with higher levels of gender, age, and race/ethnicity variance, but optimal representations of DEI in systems leadership should capture so much more.

Our charge to the INCOSE community is to address these challenges and embrace best practices to ensure that AI becomes a force for good not only in technical areas but also in promoting a more diverse, equitable, and inclusive future overall.

Learn more about INCOSE's DEI Initiative and get involved!

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Empowering Women Leaders in Systems Engineering (EWLSE) at the International Workshop (IW) 2024

By Eric Specking and Federica Robinson-Bryant

EWLSE made substantial progress at the 2024 INCOSE IW in Torrance, CA. EWLSE, in collaboration with the new Associate Director of Diversity, Equity, and Inclusion (DEI), hosted a learning workshop to encourage participants to explore their technical leadership competency, a planning session to develop strategic goals for 2024, and a networking event. Congratulations, Chris Hoffman and Lowanda Studevent, who both won copies of *Emerging Trends in Systems Engineering Leadership*, a must-read EWLSE product.
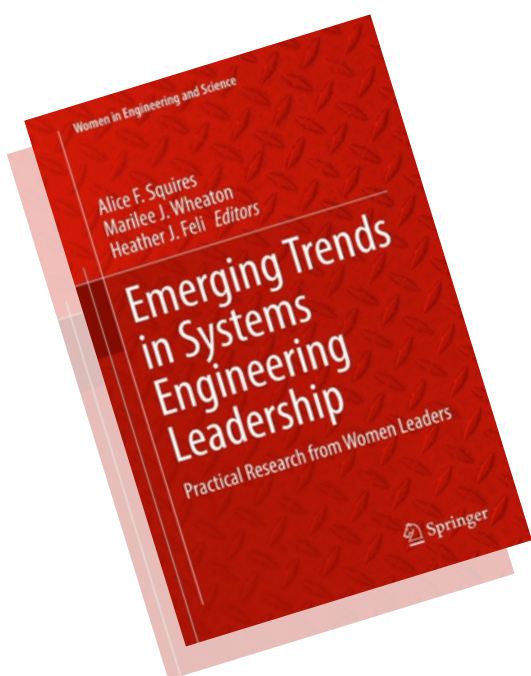
The sessions were attended by a mix of women and men who were existing EWLSE leaders, longer-standing and new EWLSE members, and those seeking to collaborate and strengthen DEI from other groups or initiatives within INCOSE and outside the organization.

The first session focused on Persistence in Technical Leadership and led participants through a series of prompts like "If you could speak to yourself at some earlier age/stage, what would you say?" Similar to the accounts found in the EWLSE product, *Letters to My Younger Self*, affirmations and reflections echoed across the room. "Yes, you stand out…and you will…Embrace it. Empower it. Remain authentic." one participant shared.

In the session entitled "Empowering Women Leaders- Planning for 2024 and Beyond," led by Dr. Eric Specking, many strengths, weaknesses, opportunities, and threats were identified. EWLSE's vision and mission were ultimately revised to reflect gender equity rather than equality in representation in systems engineering leadership, reflect a more integrative and collaborative approach to future efforts, and extend outreach to younger communities as a principal aim.

EWLSE's vision [changes in bold],

> to **champion** a world where women and men are **equitably** represented as leaders in systems engineering.

The mission is to 1) **support** an open systems engineering environment welcoming

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Photo: Participants at the IW2024 Persistence Workshop

to all; 2) promote the demonstrated value of women as systems engineers and leaders; 3) engage women **and girls** in engineering and systems engineering at all levels of education around the world; and 4) enable increased participation and retention of women in systems engineering leadership.

Then, the EWLSE networking event on Saturday evening proved to be an invaluable opportunity to meet with other EWLSE members and advocates. Attendees from diverse cultural and professional backgrounds gathered to converse about their experiences, achievements, and interests. EWLSE leadership provided an overview of its 2023 accomplishments and encouraged engagement beyond that night's gathering. One attendee said, "It was great to see friends and make new ones. I was able to talk with others and gain career advice from experts in SE." Another common observation among attendees was an appreciation for the less formal opportunity for synchronous relationship building in an in-person and open setting, especially in a post-COVID era.

In an effort to continue EWLSE's work and elevate the visibility of the value and impact of diversity, equity, and inclusion throughout

the INCOSE community and beyond, DEI is restoring an advisory team. Through strategically aligned activities and products, INCOSE will be globally recognized as a diverse and inclusive systems engineering community that fosters authenticity and advancement through dynamic collaborations that create a better world for all. INCOSE DEI is looking for a few hardworking women and men with a passion for its vision to serve on the DEI advisory committee. If interested, check the Volunteer Opportunity Board (incose.org) to learn more about the commitment and express interest in volunteering.
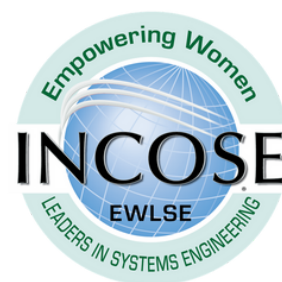
Learn more about EWLSE and get involved!

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Leaping into a new year: 2024 updates from the INCOSE SySTEAM Initiative

By Caitlyn A. K. Singam, SySTEAM Program Director, caitlyn.singam@incose.net

With 2024 being a leap year and giving us that characteristic extra calendar day (the "leap day" of February 29th), it's only fitting that SySTEAM has decided to make use of the extended calendar year this year to introduce some expansions of its own.

SySTEAM has come a long way since its first workshop in November 2021, having grown from a small, newly-founded initiative into an international, interdisciplinary volunteer group of diverse individuals, united by a shared interest in systems engineering/systems thinking and a desire to support SySTEAM's mission of "improving education for all students, everywhere". In addition to having helped SySTEAM into a global community of individuals who are passionate about helping improve the state of STEAM education (inclusive of the arts/humanities that represent the "A" in STEAM, just as much as the traditional "technical" fields of science, technology, engineering, and mathematics) worldwide, members of the SySTEAM community have also been hard at work developing a framework of recommendations and guidelines meant to equip educators, students, and practitioners alike with the

ability to integrate systems competency development into their education and training materials.

SySTEAM's general body meetings (GBMs), a staple of SySTEAM's activity portfolio, have also provided regular opportunities for community members to engage in face-to-face discussion while working on these framework recommendations, as well as a chance for stakeholders to share their input and perspectives on emerging trends and needs they have observed in systems engineering or across STEAM fields as a collective whole.

SySTEAM's mini-conference last summer played an instrumental role in truly establishing the extent to which SySTEAM is capable of serving not just as a community hub but as a resource for the international systems-education community, especially for individuals from different specialized disciplines or domains who might not otherwise have an opportunity to interact or receive strategic support for their systems-oriented endeavors outside of an interdisciplinary group like SySTEAM. Consequently, as SySTEAM heads into its .

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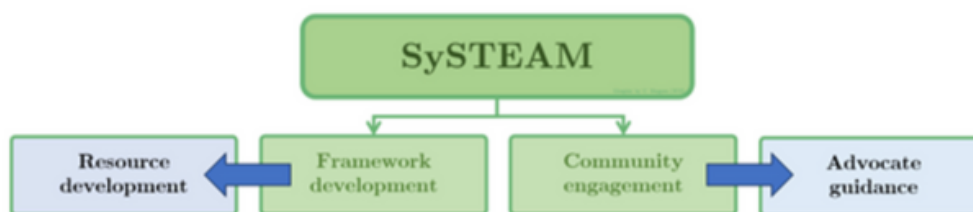
third year of pursuing its vision of making quality systems competency education universally accessible to all individuals, regardless of specialty or career path, the SySTEAM community is seeking to expand its activities and its efforts in a way that makes both participation in the SySTEAM community – as well as the products of the SySTEAM community's efforts – even more attuned to the needs and interests of the global STEAM community than ever before.

Driving visible, actual change

With that in mind, SySTEAM is seeking to expand upon its existing activity portfolio – which has previously been focused on community engagement and development of SySTEAM's system competency integration framework – in order to help make SySTEAM into a useful resource that educators, students, outreach groups, and education advocates alike can rely on or consult with in order to help facilitate their own independent, grassroots efforts. To that extent, SySTEAM is seeking not only to continue working to continue making publicly-accessible resources for the systems education community (such as guidelines on developing educational materials for outreach events, etc.) during SySTEAM GBMs, but also seeking to empower individuals inside and outside of the SySTEAM community to serve as advocates and champions of interdisciplinary systems competency education/training in

their own local communities, educational institutions, and workplaces.

Leaping forward into 2024

The SySTEAM community believes that actual, measurable, real-world change can be best seen on the grassroots level, and that the groups and individuals best equipped to make that change happen are those who are already involved in those efforts, whether those be outreach groups putting together engagement events for local students, content developers working on making accessible systems education resources for students and practitioners, or others like them.

Consequently, SySTEAM is aiming to restructure its activities portfolio for 2024 into a multi-pronged approach, so that its existing efforts and new endeavors can support each other:

(1) Continuing development of recommendations and guidelines for the SySTEAM systems competency integration framework, so that the international STEAM community can have freely accessible guidance on effective means of incorporation systems competencies into their education, training, and outreach programs;

(2) Continuing engagement of the international systems education and

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STEAM community to promote awareness of, and develop advocates for, the idea that systems competencies are a universally beneficial and necessary part of every individual's educational journey;

(3) Supporting external efforts to develop free and accessible systems education resources such as reference materials and learning tools, through strategic alignment validation with SySTEAM priorities and guidance in developing content consistent with SySTEAM values/recommendations; and

(4) Establishing the SySTEAM volunteer community as a resource to help assist the development of tools and materials for teaching or increasing awareness of interdisciplinary systems content.

Announcing SySTEAM's volunteer reviewer program

As part of SySTEAM's expanded activities portfolio, the SySTEAM Initiative is excited to be launching a volunteer reviewer program this spring, which will endeavor to match volunteers from the SySTEAM community and the general public with systems education resources that are in need of content reviewers and audience "beta-testers". This program aims to support the improvement of existing systems engineering and system competency education tools and resources, and will provide a means for external groups to "beta-test" educational content for readability, useability, and accessibility by making it possible to get preliminary feedback from volunteers from the SySTEAM community who are from similar

stakeholder group(s) (e.g., STEAM educators, college students, industry professionals, etc.) as their targeted audience.

Notifications and details about how to sign up for the reviewer program will be posted on the SySTEAM website, email listserv, and Discord community hub once additional details are available.

Join INCOSE SySTEAM

We always remain on the lookout for new community members, and welcome any interested individuals to join us online via our free Discord community hub (join link: https://bit.ly/3oy1GmF). Regardless of your professional background, location, or level of commitment, there's likely something you can contribute to SySTEAM. If you would like to join SySTEAM, or are interested in learning more about the initiative, please contact the SySTEAM initiative lead and Program Director, Caitlyn Singam, at caitlyn.singam@incose.net.

We hope you'll join us as we continue to work towards our goal of improving education for all students, everywhere!

2024 Systems Engineering and Architecting Research Network (SEANET) Update

By Paul Wach, Assistant Director for Student Matters

Student activity with INCOSE started off 2024 with a brand-new event, SEANET at IW. SEANET was created for systems engineering doctoral students to serve as a network of peers and mentors. Although SEANET has been ongoing, SEANET is being expanded this year to include three events.

At IW, students were guided through the challenges of finding a research question from three perspectives: (1) importance to the practice of systems engineering, (2) importance to systems engineering academia, and (3) the bridge between practice and academia.

Mentors included Dr. Taylan Topcu from Virginia Tech, Dr. Bob Kenley from Purdue, and Mr. Karson Sandman from The Aerospace Corp. Each mentor led a roundtable discussion focused on the three perspectives.

We had a healthy turn-out and participation from students, for this being the first event of its type. Feedback from the students has been very positive. To quote Joanna Josephs from the University of Arizona; "SEANET at INCOSE IW was a fantastic opportunity to meet my peers and engage in conversation with mentors from both industry and academia! This opportunity to network, learn, and stay connected to the systems engineering community is an invaluable part of the PhD journey. I highly recommend the experience to all current and aspiring systems engineering graduate students!"

The plan is to continue growth of SEANET, including renewing the event held at IW next year. As for this year, we welcome students and mentors to participate in SEANET at the Conference on Systems Engineering Research (CSER) held in Tucson, Arizona, USA. For more details, please visit https://cser.info/cser2024/seanet or contact me at paul.wach@incose.net.

We hope to see you in Tucson!

conference on systems engineering research
March 25-27, 2024

Updates from INCOSE's Technical Leadership Institute (TLI)

By Suja Joseph-Malherbe, TLI Coach, suja.joseph-malherbe@incose.net

Nominations for TLI Cohort 10 are now open and close on March 29th.

The International Workshop (IW) provided an additional platform for the TLI to engage with individuals who can nominate candidates on the nomination process, criteria for nomination, and information about the Institute and its members. To learn more, visit www.incose.org/learn/tli. We look forward to Cohort 10 beginning their journey in June 2024.

Recalling that INCOSE values volunteerism and that INCOSE is led by volunteers who set our fundamental direction, it is heartwarming to see numerous members of the TLI leading in chapter, sector and working group roles as well as corporate responsibilities. The TLI members serving on the Board of Directors are Chris Browne (TLI Cohort 4, The Australian National University, Deputy Director for Services), Heidi Davidz (TLI Cohort 4, ManTech, Director for Services), Bernardo Delicado (TLI Cohort 1, Indra, Director for Outreach), Olivier Dessoude (TLI Cohort 1, Naval Group, Director for Technical Operations), Quoc Do (TLI Cohort 1, Frazer-Nash Consultancy, Director for Asia-Oceania), Stueti Gupta (TLI Cohort 7, BlueKei Solutions, Secretary), and David Long (TLI Coach, Blue Holon, Director for Strategic Integration). We wish them all the best as they embark on this part of their lifelong learning journey as they continue to learn by leading and learning together.

The word institute in TLI embodies the definition of an *organization for the promotion of a cause*. Simply put, the cause is to continually explore and evolve leadership concepts in the context of systems engineering. It is an institute made up of its members that exists to support each member's ongoing learning journey beyond the initial two-year experience. It is a place for leaders to grapple with and explore leadership concepts by learning together.

Hosting social and topical engagements at regional and international events as well as the recently launched quarterly virtual workshop series are other ways the TLI seeks to support each member's ongoing learning journey. At IW 2024, Juan Llorens (TLI Cohort 1, The REUSE Company) led an engagement event on *"Intercultural Communication,"* helping us appreciate and navigate the cultural differences of our interconnected world. As always, in true Juan style, it was informative, engaging, and entertaining, as evident in the dialogues on the topic after the event.

At the most recent quarterly virtual workshop series, Willy Donaldson, Founder and President of Strategic Venture Planning and author of *Simple Complexity*, shared his

Photo: TLI topical engagement at IW 2024 in Torrance

Photo: TLI members gather socially at IW 2024 in Torrance

insights on *"Systems Engineering Re-envisioned: Hard Truths about the Soft Stuff."* It was a highly informative and well-timed topic based on the level of engagement. The key takeaway is our ability to recognise and appreciate that we all interpret the world around us and make sense of it uniquely will greatly influence the way we engage with one another to achieve desired outcomes.

FIND OUT MORE ABOUT THE TLI AT INCOSE.ORG/TLI

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ChatGPT for SE Workshop

By Kelly Henseler

A highlight of the International Workshop this year was the ChatGPT for SE session led by the Associate Director of Artificial Intelligence (AI) Research at Collins Aerospace (RTX), Barclay Brown, Ph.D., ESEP. The first session had attendees bringing in extra chairs, standing in the doorway, and listening from the hallway in an otherwise standing-room-only event space. The second session was equally as well-attended and had folks lining up to try out real-time ChatGPT experiments during the second half of the workshop. It is clear that AI is at the top of many people's minds for how we can use it for personal and professional use.

Brown began his session with an overview of generative AI, including essential prompt-engineering tips and practical uses. Multiple examples were given to demonstrate how large language models (LLMs) like ChatGPT can be used in a variety of ways, such as writing a legal brief, analyzing survey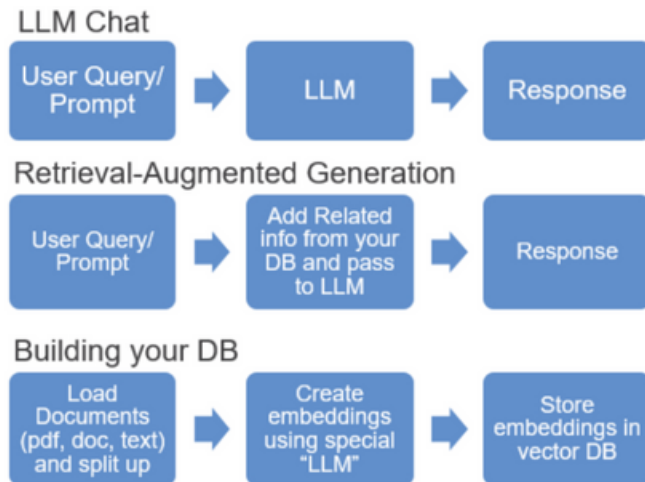 responses, preparing materials for a professional panel on a talk show, extracting information from email responses, and vectorizing data for retrieval-augmented generation.

Brown made sure to address the AI elephant in the room: how much can we trust the accuracy and integrity of these models? He discussed the importance of fact-checking and resource validation to ensure no AI hallucinations occur and outputs are correct. He also showed examples of how you can ask AI to check its work.

While the practical applications of an LLM for a systems engineer are valuable, the creative aspects of the potential for these applications cannot be overlooked. Brown also introduced the crowd to his recent fun experiment, Deep Trek. If you've ever wondered about the lengths that large language models can go, think bigger. How about being the captain of the Enterprise with the ability to go on any mission anywhere in the universe?

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Retrieval Augmented Generation: An LLM Application Pattern

- Find source material
- Create index and store
- Take user prompt, and search for related information in index
- Pass search results along with prompt to LLM
- The indexer calls an type of LLM to build the index, so KNOW where your data is going!
- Indexers may use commercial embedding models like
- Llama-index can also work with open source and downloaded LLMs

LLM Chat

User Query/Prompt → LLM → Response

Retrieval-Augmented Generation

User Query/Prompt → Add Related info from your DB and pass to LLM → Response

Building your DB

Load Documents (pdf, doc, text) and split up → Create embeddings using special "LLM" → Store embeddings in vector DB

Brown recently released an experiment using ChatGPT to allow you to engage with the Star Trek universe. Using scripts from the shows, Brown programmed Deep Trek to have knowledge of the original series (Captain Kirk) and the next generation series (Captain Picard).

Deep Trek
Captain the Enterprise on any mission in the universe
Search "Deep Trek" at https://chat.openai.com/gpts

Since the AI was programmed to use knowledge from both series, you can choose your ship and crew or even mix them between the series. Ask Data and Spock to work together on something? No problem.

You can refer to or ask for research on anything seen on the series or head off in your own direction to create a new adventure.

- Request a mission.
- Make first contact with an alien species.
- Collaborate on projects.
- Enhance the ship.
- If you can dream it, you can prompt it!

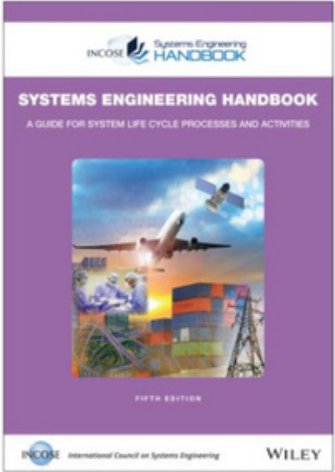If you have a ChatGPT Plus subscription, you can try Deep Trek at https://lnkd.in/e8JWVQQe.

To view the recording of the first workshop session, click here: IW2024 - ChatGPT for SE Workshop (incose.org).*

To view the recording of the second workshop session, click here: IW2024 - ChatGPT for SE Workshop (incose.org).*

*The second session's introductory presentation is longer and covers more of the material, but both sessions are worth viewing since the real-time ChatGPT experiments differed between sessions based on participant requests and interests.

INCOSE has an active AI Systems Working Group (WG), led by Brown, that focuses on using AI within systems and using AI as part of systems development. The WG encourages research to be conducted by members or via collaboration with other organizations.

If you want to join the AI WG, visit the Artificial Intelligence Systems Working Group Webpage.

The Systems Engineering Handbook 5th Edition

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2025 Annual INCOSE international workshop

HYBRID EVENT

Seville, SPAIN
February 1 - 4, 2025

🇪🇸 NEXT YEAR #INCOSEIW TRAVELS TO SPAIN... SAVE THE DATE

Whatever your background and experience, the Annual INCOSE International Workshop is an ideal opportunity to contribute to the start of the art in your discipline, forge worldwide connections and enhance your career. In 2025, enjoy all of these great advantages in Seville, 1-4 February!

Dates
Saturday 1 February – Tuesday 4 February, 2025

The Venue
Barceló Sevilla Renacimiento
Avenida Álvaro Alonso Barba,
Sevilla, 41092 - SPAIN

🎉 RECORD-BREAKING FIGURES FOR #INCOSEIW 2024!

Huge thanks to the 781 attendees who joined in person or remotely, and to everyone who contributed to a fantastic program with inspiring keynotes, countless meetings, and a memorable Robot Cabaret!

539 participants in Torrance	87 working group meetings	502 unique connections on the virtual platform
242 remote attendees	45 business meetings	343 sponsor showcase visits
302 first time attendees	189 meeting sessions	126 gallons of coffee
28 countries represented	380 hours of meetings	1,840 lunches

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Stay tuned for more! www.incose.org/IW2025

#INCOSEIW - Join the conversation

Board of Directors Updates and Transitions

INCOSE is grateful for the tireless efforts that our Board of Directors puts in year after year. The 2024 International Workshop was a time to recognize the board members who transitioned off the board and welcome new board members to their leadership positions.

Join us in thanking the following board members for their service and wishing them well in their new adventures:

Kerry Lunney
In recognition of dedicated service as
Chair, Nominations & Elections (N&E) 2023

Kirk Michealson
In recognition of dedicated service as
Chair, Policy Management Committee (PMC) 2021-2023

Richard Martin
In recognition of dedicated service as
Assistant Director, Standards Department 2021-2023

Andrew Pickard
In recognition of dedicated service as
Chief of Staff (CoS) 2018-2023

Erika Palmer
In recognition of dedicated service as
Deputy Technical Director 2023

Barclay Brown
In recognition of dedicated service as
Chief Information Officer (CIO) 2021-2023

Honor Lind
In recognition of dedicated service as
Director, Marketing and Communications (MarCom) 2022 & 2023

Richard Beasley
In recognition of dedicated service as
Director, Services 2022 & 2023

Kirk Michealson
In recognition of dedicated service as
Director, Outreach 2023

Serge Landry
In recognition of dedicated service as
Director, Asia-Oceania Sector 2018-2023

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Ron Giachetti
In recognition of dedicated service as
Chair, Corporate Advisory Board (CAB) 2022 & 2023

Don York
In recognition of dedicated service as
INCOSE Secretary 2023

Mike Vinarcik
In recognition of dedicated service as
INCOSE Treasurer 2020-2023

Marilee Wheaton
In recognition of dedicated service as
INCOSE President 2022 & 2023

INCOSE would also like to welcome the following new board members that were installed during the International Workshop opening plenary:

Ralf Hartmann
INCOSE President

Michael Watson
INCOSE President-Elect

Alice Squires
INCOSE Treasurer

Bernardo Delicado
Director, Outreach

Quoc Do
Director, Asia-Oceania Sector

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Michael Dahlberg
Chair, Corporate Advisory Board (CAB)
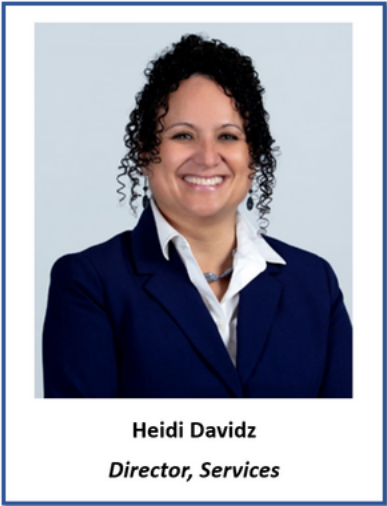
Heidi Davidz
Director, Services

Thank you all for your dedication and service to our organization. Your passion, expertise, and countless hours have made an immeasurable impact on our work. INCOSE wouldn't be where it is today without your guidance and support.

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INCOSE Board Positions Open for Nomination

INCOSE is now accepting nominations for the following positions:

- Secretary
- Sector Director, Americas Sector

The INCOSE Secretary is an elected, two-year term officer position. The Secretary serves as a member of the Executive Committee and a voting member of the INCOSE Board of Directors (BOD). As Secretary, this officer formulates agendas and records the official proceedings for all Board of Director and Executive Committee business meetings.

The Americas Sector Director is an elected Director position with a three-year term of office and is a voting member of the INCOSE BOD. The Sector Director is responsible for representing the voice of the chapters within the sector and providing effective and timely two-way communications between members/chapters and the BOD. The Sector Director also acts as the INCOSE spokesperson on sector-related issues within their respective sector.

To read more about each position and how to submit a nomination, visit www.incose.org/about-incose/nominations-elections.

Wheaton reflects on term as President

By Beth E. Concepción

At IW 2024, Marilee Wheaton turned over the organization's reins to Ralf Hartmann, President-Elect. As she moves on to Deputy Chair of the Nominations & Elections Committee, she reflected on her time at the helm.

"The key thing I learned is how truly global INCOSE is," she said.

She said she was impressed by the participation and dedication of the members who buy into the One INCOSE value.

"We all have a passion for the fact that systems engineering really does create a better world through a systems approach," she said.

Wheaton has been a member of INCOSE since 2002, but has spent 40 years in the systems engineering field. Until she took on the President-Elect and President roles, however, she said she didn't realize how many people and working groups are involved to create products and services that help members and the larger systems engineering community.

She pointed to IW 2024 as an example.

"There were 781 people at IW – more than 500 in person," she said. "All coming specifically to work. They paid registration fees to come and work for the benefit of INCOSE members and the broader systems engineering community."

That was one of the reasons she took on the role in the first place: to support future leaders.

"I wanted to pay it forward and give back to my profession," Wheaton said.

During her tenure, INCOSE hired its first executive director in Steve Records.

"That was a large accomplishment, she said. "That investment is going to make a big difference in the future."

INCOSE also launched the Professional Development Portal and published SE Vision 2035.
"That team did an amazing job of working inside and outside of INCOSE to determine that vision," she said. "Then creating FuSE to enable that vision."

Wheaton noted the talent, time and resources necessary to run an organization like INCOSE, led by volunteers.

"Some days, I wish there were more hours in the day," she said. "We could always do more in terms of recognizing our volunteer leaders. I never forgot to say thank you in a very specific way."

Wheaton said she knows the organization is in good hands.

"There is such a strong leadership team," she said. "Ralf and I share a lot of the same

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vision and values. I just know that that leadership team is going to continue doing great things."

In addition to the Nominations & Elections Committee, Wheaton said she is going to continue working with EWLSE and DEI efforts.

She said she wants to make sure to stay connected as she has gained something very valuable through INCOSE. "I've gained a lot of close friends and colleagues. Those are going to continue," she said. "Having those close friends and colleagues means the world to me."

Landry reflects on tenure as Asia-Oceania Sector Director

By Nick Cotton

After being a member of the board responsible for the Asia-Oceania Sector for six years, Serge Landry is exiting the role of Director.

Landry describes his time as "a great opportunity to contribute and learn the intricacies of a 'big company.'" It was also not without challenges though.

Landry noted some of these challenges as being the COVID 19 pandemic, which reduced his opportunities to meet the sector leaders in person and forced him to reconfigure his plans -- particularly as restrictions in the Asia Oceania area lasted longer than other parts of the world. The second challenge was the requirement for night shifts, so that he could participate in board meetings with members around the globe.

However, Landry maintains that he had opportunities too. During his six years, he had the opportunity to meet and be part of three successive teams of Board members led by three Presidents, network with members from all around the world, and contribute to the transformation of the organization. This led Landry to push what he "thought was possible in terms of time management."

"I also got to know many outstanding and dedicated people in the process," he said.

As for his accomplishments in the role, Landry contributed to:

- The growth of the Asia-Oceania Sector, with individual membership numbers multiplied by three in eight years.
- Increased contribution of the sector to INCOSE central (as attested by the increased Sector visibility in the Newsletter).
- INCOSE increased awareness of cultural differences and using time zones more efficiently, and the need to reach out to underserved geographies.

Landry has some advice for members: "Get involved, contribute and you will get more out of your membership, as this will increase your understanding of what is available to you, be able to shape what you want the organization and Systems Engineering to be, and develop your knowledge of new areas."

He also noted other benefits including being acknowledged by your peers, supporting others, developing your network and growing your impact beyond your direct professional circle.

As for the future, Landry said he plans to "take a break to recharge and refocus on where I want to contribute next." But not before helping his successor hit the ground running by continuing to develop certification equivalency in the sector.

"[I also want to be] involved in outreach in the sector to ensure that we increase engagement and further our growth in the place and geographies where we need to be more present or where we are currently underrepresented," he said.

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Boyer remains leader in member engagement

By Nick Cotton

Talk to anyone in INCOSE and chances are they know Don Boyer. Boyer has been an INCOSE member since 1997, and recently retired from the position of Associate Director for Engagement.

He has had an interesting path in INCOSE. Boyer retired from Raytheon in 2001 and moved into part-time consulting. As this meant that he was no longer working daily with systems engineers, he decided to become active in the North Texas chapter. The involvement allowed him to network with experienced systems engineers and to keep up with developments. Boyer took on the Vice President position and then became President in 2006.

He said his networking opened up many opportunities to get involved and contribute to initiatives — even though he only thought of it as "just getting to meet a lot of very interesting systems engineers."

After serving as Chapter President, Boyer decided to attend International Workshops, where he was asked to serve on the Awards Committee. He later became co-chair and helped with the awards for about 10 years. Boyer said the awards submittals he reviewed made it apparent that there was a need for better resources for chapter leaders.

In 2009, Boyer was asked by the then Member Board to develop a support program for the chapter leaders, which he named Keys to Effective Chapters." This program

consisted of a Wiki organized by the awards criteria, containing guidelines, tips, how-tos and Chapter Leader Training materials. He also began an initiative to send welcome emails to new members, which has recently moved to the PropFuel platform.

Boyer's work made it clear that member engagement was a key issue. In 2016, he became Associate Director for Engagement -- a role he had until 2021. Boyer worked with Amanda Kaiser and Honor Lind to understand best membership practices and root causes for issues with engagement, leading to the formation of the New Member Engagement team.

Boyer recommends getting involved with INCOSE opportunities, that have particular or new interest. "You get to keep up with your various systems interests and interact with many knowledgeable and encouraging like-minded members," he said. "It is a great way to enrich your retirement!"

Not that he is really retired. Boyer remains involved with INCOSE on the New Member Engagement team and helping to update the Keys to Effective Chapters Library and portions of chapter officer training.

Looking ahead, Boyer intends to stay involved, as his INCOSE journey has "been a fun and rewarding part of retirement." He said he is thankful for the opportunities INCOSE offers, and for all those he has worked with who encouraged and guided him.

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Lind transitions into full-time staff role at INCOSE

By Beth E. Concepción

Every time you read an article about INCOSE on LinkedIn, in the newsletter, or in the various other INCOSE communication channels, you are seeing the work of Honor Lind and her Marketing and Communications team.

Lind served on the board until January, when she accepted the position of Marketing and Communications Director for INCOSE. She started working with INCOSE in 2021 as a contractor to help create programs to engage with new members.

Soon that blossomed into a full-time role. Lind's background is well-suited to her work with INCOSE as she has plenty of marketing and communications experience with nonprofit organizations such as Institute of Industrial and Systems Engineers, Naylor, and Hart Initiative. She also has a master's degree in public administration, nonprofit management, and community development and sustainability.

"I have learned a lot about the value of stakeholder relationships and what it means to think from a global perspective of inclusion and the importance of listening to our members' needs to create a better world through systems approach," she said.

Despite the fact that she is not a systems engineer, her understanding of relationship-building has gone a long way at INCOSE.

"Whether you are systems engineer or not, systems thinking is critical for everyone to be effective," she said. "Through partnerships, volunteers, and team efforts, INCOSE continues to soar to new heights. It takes hard work and dedication from all the volunteers, members, and leaders to make this happen."

Lind's accomplishments include increasing awareness, communication, and memberships through integrated approaches to marketing and communications.

She keeps coming up with new ideas to engage members.

"I really want to create a podcast and a syndicated show," Lind said. "INCOSE never sleeps, and we need to keep engaging and providing resources to our valued global community of systems engineers."

Lind said she truly enjoyed working with fellow board members over the last two years.

"I learned a great deal about listening to each member of the board in order to make informed decisions," she said. "I am grateful for my time on the board and appreciate the dear friends I made while serving the global community of systems engineers. I learned a great deal from everyone. I am so grateful

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to have had the opportunity to serve INCOSE."

Her work isn't done, though.

"As the Marketing and Communications Director, I look forward to working with our global community of systems engineers to build a better world through a systems approach," she said.

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Beasley reflects on INCOSE Board service

By Beth E. Concepción

If you are enjoying new INCOSE services such as the Professional Development Portal, the mentoring service, the SE Lab and the Cafes, you have Richard Beasley to thank in part. He just rotated off the INCOSE Board as Services Director, where he led a large team to add value to the INCOSE membership.

"The main accomplishment was simply ensuring that the 'idea' of services was part of most Board-level discussions, and we were getting past the idea of just producing technical product," Beasley said.

Though he said he is proud of his accomplishments and those of his team, he does wish he had made more progress in the distribution of INCOSE material, rather than just publication.

"As a systems engineer I would have liked to have systems engineered the services better – which would have led to better identification of metrics to ensure we are checking the value of what we are delivering (rather than just feeling it was a useful thing)," he said.

"I wanted to do more on enabling 'continued conversation' after events, meetings etc., or around INCOSE publications – so we could get the diversity of views from across the wide range of INCOSE members active in

continued, lively debate."

Beasley said he is very proud of the team, and enjoyed the challenge of delegating and letting go.

"Different people have different viewpoints and different motivations and those need to be listened to," he said. "Especially in a volunteer organization, there is no 'command and control' – you have to motivate people to do things, and so they need to see them as valuable in their terms – which might be a different value to what is motivating me."

Beasley said he is still motivated to continue contributing to INCOSE.

"I should have learnt to say 'no' and to stop volunteering – but instead I am in the process of setting up a new working group, aimed at producing advice on 'Embedding Systems Engineering into Organizations,'" he said.

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Reflection on my time as INCOSE Chief of Staff

By Andy Pickard

In late 2015, Alan Harding (at that time INCOSE President-Elect) contacted me and asked if I would be interested in taking on the role of INCOSE Chief of Staff. This was a new role aimed at supporting the INCOSE President and President-Elect in the performance of their roles. The Chief of Staff role involved becoming a non-voting member of the INCOSE Board of Directors. I agreed to start in the role at the International Workshop in 2016, when Alan became INCOSE President. One of my first activities was to write the Position Description for the role.

Another early activity was to look at the status of the INCOSE policies. Many needed review, so the first task was to establish a RACI (Responsible – Accountable – Consult – Inform) matrix allocating these roles to the INCOSE Leadership for each policy. Subsequently, the RACI was adopted by the Policy Management Committee; Kirk Michealson, as Chair of the Policy Management Committee. I then planned and executed a project to review all policies and update them within three years. This was accomplished, and now each policy is regularly reviewed and updated. I established similar RACIs for Procedures, Forms, and Templates, which are now subjected to regular review and approval via the Policy Management Committee.

In mid-2016, INCOSE adopted a new database for membership management. Shortly after this, I was asked to run analyses of membership growth and expired memberships. This grew into a significant task to investigate membership retention at the Organization, Sector, and Chapter levels. This included a review of those members who were receiving discounted membership fees. At the time, a task team had been set up to review the Chapter Governance and Financial Model (CGFM). Realizing the synergy of this with the discounted membership fee analysis, I joined the CGFM task team. Work with this team resulted in the introduction of the Purchasing Power Parity (PPP) metric to calculate membership fee discounts based on country of residence. This resolved all the discrepancies in discounted membership fees and has been a feature of the INCOSE membership model ever since.

As part of the Membership Analysis, I also tracked metrics of Corporate Advisory Board (CAB) Associates and regular Members by organization to identify potential new CAB and Academic Council members.

I have been heavily involved in the Information Technology (IT) transitions in INCOSE over the years, including managing the migration of information from INCOSE Connect to Teams and Yammer.

More recently, I analyzed paper reviews for the INCOSE International Symposium,

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looking for reviewer bias. To date, the results have been reported to the Technical Director. I am still working to complete this analysis.

During my time on the Board, I have observed the high level of commitment and dedication of the Volunteer Board members. I was a member of the team that evaluated options, which resulted in the recruitment of the INCOSE Executive Director. This is having a major and, I believe, beneficial effect on INCOSE. One of the things I have enjoyed while being Chief of Staff for seven years is seeing the changes in the organization and the impact of different styles of leadership. This extended period on the Board has allowed me to provide a level of continuity and "memory" for the Board.

With leaving the Chief of Staff role, I look forward to getting more involved with the INCOSE Working Groups. I have joined the Complex Systems Working Group to work on Complex System Heuristics. I have also joined the Nominations and Elections Committee and anticipate getting involved in analytical work such as reviewer bias analysis. Overall, I have enjoyed taking on the Chief of Staff role and now look to see much of the role transferred to the INCOSE staff.

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Watson takes on role of President-Elect

By Beth E. Concepción

Michael D. Watson, Ph.D., said he is ready for his next big role in INCOSE: President-Elect.

"I want to learn how to play a role as a leader in a volunteer organization at the presidential level," he said. "I can learn a lot from Ralf Hartmann and from previous presidents Marilee Wheaton, David Long, Garry Roedler, Alan Harding."

Watson has been a member of INCOSE since 2014. Most recently, he served as Chair of the Systems Engineering Principles Action Team and the Chair of the Complex Systems Working Group. As CSWG chair, he advocated for the establishment of the Social Systems Working Group and has worked to establish collaborations across several working groups.

As Chair of SEPAT, Watson led a team of a dozen authors/contributors to create the Systems Engineering Principles Publication, launched in conjunction with the 32nd annual International Symposium in 2022.

One of his passion projects now is enhancing and expanding the academic track to further student participation.

"That's an exciting aspect for me -- to see us grow in that area, which I think will have a multiplier effect," Watson said. "How do we expand out, get more universities involved, get more student chapters? We want to encourage universities to offer systems engineering curriculum. Those are the things that I'm wanting to explore and learn as I go."

Watson said he also wants to expand INCOSE membership into groups that may not have the resources to engage in an IW or IS. "We need to have some financially viable approaches to engage these groups more effectively," he said. "I would like to improve accessibility to students, systems engineers in areas with smaller industrial bases, and small businesses in support of increasing INCOSE membership."

Watson also is a strong advocate for the advancement of the practice and theory of systems engineering.

"INCOSE is not going to grow very much beyond where we are in terms of state of practice if we don't bring in the advancements in systems engineering," he said. "Bringing in advancements moves practice forward. Advancements that don't move the state of the practice forward aren't all that practical either. The question is: How do we get all those things internally growing?"

Watson started his systems engineering career with the National Aeronautics and Space Administration in 1989, serving in lead systems engineering for a number of NASA Program projects and NASA Branches including the Spacelab Program and International Space Station Program, and also was the founder of the NASA Systems Engineering Research Consortium

After retiring from NASA, he joined Leidos Dynetics and is the SE&I Branch Manager In the Space Division.

Watson said he is really looking forward to his new role. "I am seeking to continue initiatives, facilitate their progression, and expand our reach into different sectors in industry and culture across the world," he said.

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Introducing the New Corporate Advisory Board (CAB) Chair, Michael Dahlberg, Ph. D.

By Kelly Henseler

Systems Engineering has been at the heart of Michael "Mike" Dahlberg, Ph.D.'s career ever since he first stepped into the engineering world. His experience spans industries including industrial, defense, aerospace, information technology, and academia.

His current position as Senior Director, Defense Systems Engineering at KBR, Inc. is what first brought him to the INCOSE Corporate Advisory Board (CAB), and INCOSE is grateful to call him the new CAB Chair.

Mike has always found great value in his time on the CAB and emphasizes the importance of its position: "The CAB has a unique role to be the voice of the customer to INCOSE Leadership. CAB representatives identify needs from industry/academia as inputs to INCOSE working groups and initiatives that produce critical systems engineering products. Individual CAB representatives have a direct ability to shape INCOSE strategic direction and priorities." As the new CAB Chair, Mike will be able to help guide these conversations between industry and INCOSE leadership to ensure all CAB voices are heard for input in future strategy.

When asked what interested him in taking on his new leadership role, Mike said, "I have been impressed by the commitment and passion of the largely volunteer led INCOSE organization. After I attended a series of CAB Meetings, I was compelled to help build upon the current baseline established by many great leaders and volunteers and contribute to the future of systems engineering." Mike will be one of the many volunteers who devote their valuable free time to their INCOSE work after working hours. Having Mike's guidance and all of the CAB's active industry insight will be invaluable to the Board of Directors (BOD) and all of INCOSE.

Mike plans to stay involved with his local chapter and at INCOSE events during and after his time as CAB Chair. Thank you, Mike, for taking on this critical INCOSE role!

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Introducing INCOSE's New Outreach Director, Dr. Bernardo A. Delicado, ESEP

By Kelly Henseler

While Dr. Bernardo A. Delicado, ESEP, may be new to his role as Director of Outreach, he is no stranger to the INCOSE community! His INCOSE history includes being an engaged member for 11+ years, graduating from the INCOSE Technical Leadership Institute (TLI), editing the INCOSE Systems Engineering Handbook Version 5, being an Academic Equivalency Coordinator with the Corporate Advisory Board (CAB), mentoring with INCOSE Mentoring Services and now being elected as a key leader on the INCOSE Board of Directors. In other words, Dr. Delicado has worn many hats in his INCOSE tenure!

When asked what has kept him so engaged in the work of INCOSE, he said, "My driving factor to stay involved in the INCOSE community stems from my passion for systems engineering and the desire to contribute to its advancement. Being part of INCOSE allows me to connect with like-minded professionals, stay updated on industry trends, and collaborate on impactful projects beyond my day-to-day work." Dr. Delicado's enthusiasm is contagious, and it's clear that his involvement in INCOSE is more than just a professional commitment; it's a personal passion.

With such a well-rounded history with INCOSE, it was difficult for Dr. Delicado to choose a single memorable moment from his tenure. Still, one achievement stood out: serving on the editorial team for the Systems Engineering Handbook Version 5: "In this role, I had the opportunity to develop my leadership skills by being responsible for communication with a diverse community of primary points of contact from INCOSE Working Groups and Subject Matter Experts. My responsibilities included capturing their inputs for the sections of the handbook and ensuring that the content reflected the latest advancements and best practices in systems engineering." He also coordinated the initial stages of translating the English version of the handbook into multiple languages, including German, French, Italian, and Spanish.

Making the transition onto the INCOSE BOD carries with it a new list of responsibilities and tasks, including spearheading INCOSE's engagement strategy, developing annual plans, forging alliances, and nurturing a robust volunteer network, all to advance the INCOSE mission across diverse sectors and regions. When asked what made him interested in the Outreach Director role, Delicado said, "I believe effective communication and engagement are crucial for the growth and sustainability of any community. I'm most looking forward
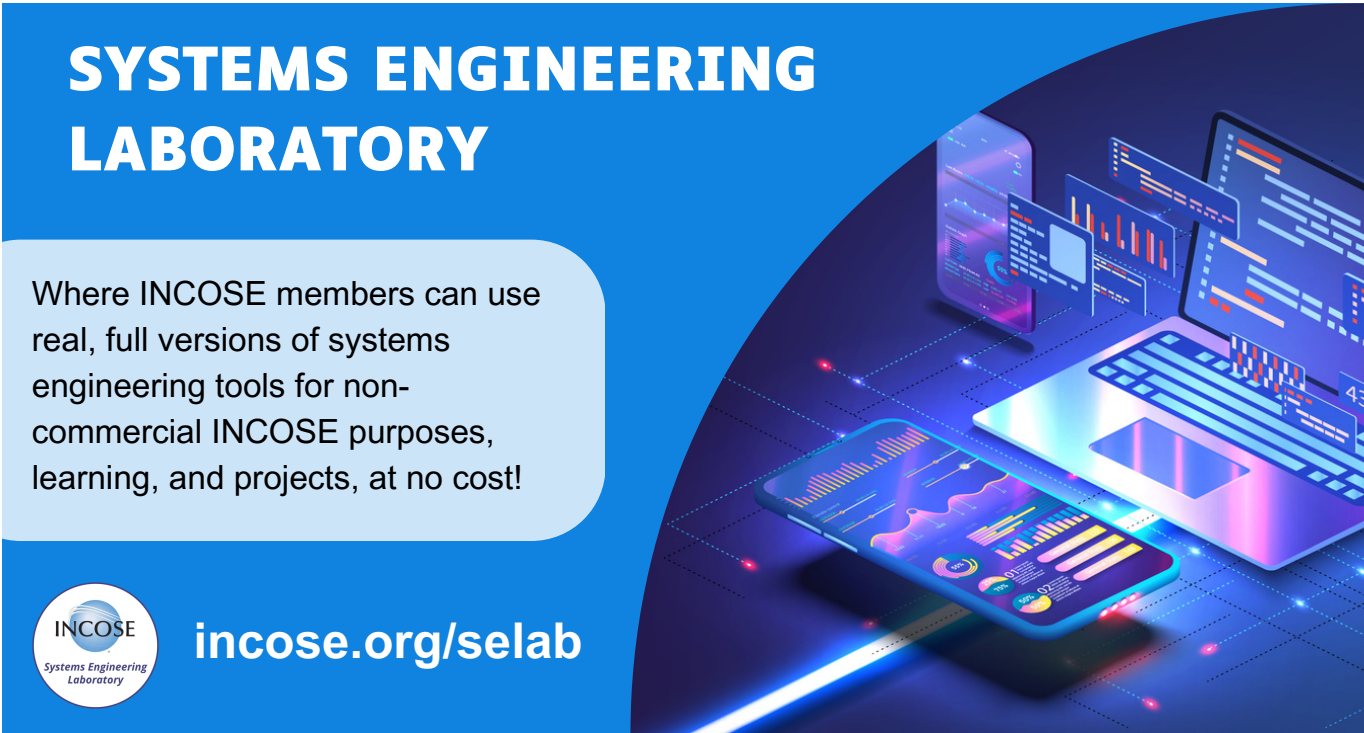
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to leveraging my experience and skills to expand INCOSE's reach, foster collaboration with other organizations, and inspire the next generation of systems engineers through outreach initiatives."

Dr. Delicado plans on staying involved with the INCOSE community beyond his new BOD role, including being active in the mentoring program and working groups, where he can not only help guide new systems engineers but also advance the field through collaborative efforts and knowledge sharing. "Additionally, I am excited to take on the role of Editor-in-Chief of Part 5 (Enabling Systems Engineering) of the Systems Engineering Body of Knowledge (SEBoK). Leading its restructuring as part of a comprehensive review process for all parts of the SEBoK, I aim to ensure its relevance and comprehensiveness in capturing the

evolving landscape of systems engineering practices for individuals and organizations." The SEBoK is a critical resource for systems engineers around the world, and Dr. Delicado's leadership in its restructuring will ensure that it remains a valuable guide for the profession.

And he doesn't stop there! Dr. Delicado is also discussing serving again as an editor of the Systems Engineering Handbook Version 6. Dr. Delicado says, "This opportunity presents an exciting prospect to shape the future direction of the handbook and facilitate the dissemination of cutting-edge methodologies and best practices to the broader systems engineering community."

Thank you, Dr. Delicado, for the work you continuously put into the global INCOSE community year after year!

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INCOSE Prepares For the Future with New Staff!

The idea of an Executive Director and a professional staff was born several years ago and was put into action with the hiring of Steve Records last year. Part of the new INCOSE strategy includes an objective for operational excellence. As part of the means to achieve this, Records is in the process of hiring a professional staff to support INCOSE. This next step in INCOSE's evolution brings the organization into alignment with professional association best practices and will aim to maximize the time and energy of our volunteers.

Volunteers are still the lifeblood of INCOSE and we are ever grateful for the time that our volunteers give to the organization. One of the goals of this tactic in operational excellence is to allow our volunteers and leadership to focus on strategy, governance, and oversight, rather than administrative and operational tasks. INCOSE will look to our members and volunteers as the thought leaders and to our staff as the team that can

support and execute.

There are five teams being developed within the staff structure: Operations, Marketing, IT, Technical, and Events.

Strategically, building an INCOSE staff does more than just advance operational excellence. INCOSE is now hiring on a global scale to reflect INCOSE's global footprint and to support all our members. INCOSE has already hired two people in Europe and one person in India with a goal and future preference for non-US staff moving forward.

Moving to a full staffing model does two additional things. First, it expands the overall capacity of INCOSE to get more done and support initiatives more efficiently. Second, it is more cost-effective long term rather than using outside contractors for the administration and operation of the organization.

Operations
- Accounting and Finance
- Membership
- Member Services
- Chapter Support

Marketing
- Awareness
- Communications
- Outreach mgmt.
- Sponsorship
- Advertising
- Copy Writing
- Website Content

IT
- Database Admin
- Technical Support
- Product/Service Development Support

Technical
- Technical Operations Support
- Certification
- Training
- Publications and Distribution
- FuSE
- Services Development
- Services Management

Events
- Events Planning
- Events Production
- Contracting
- Logistics
- Sector/ Region/ Chapter Events Support

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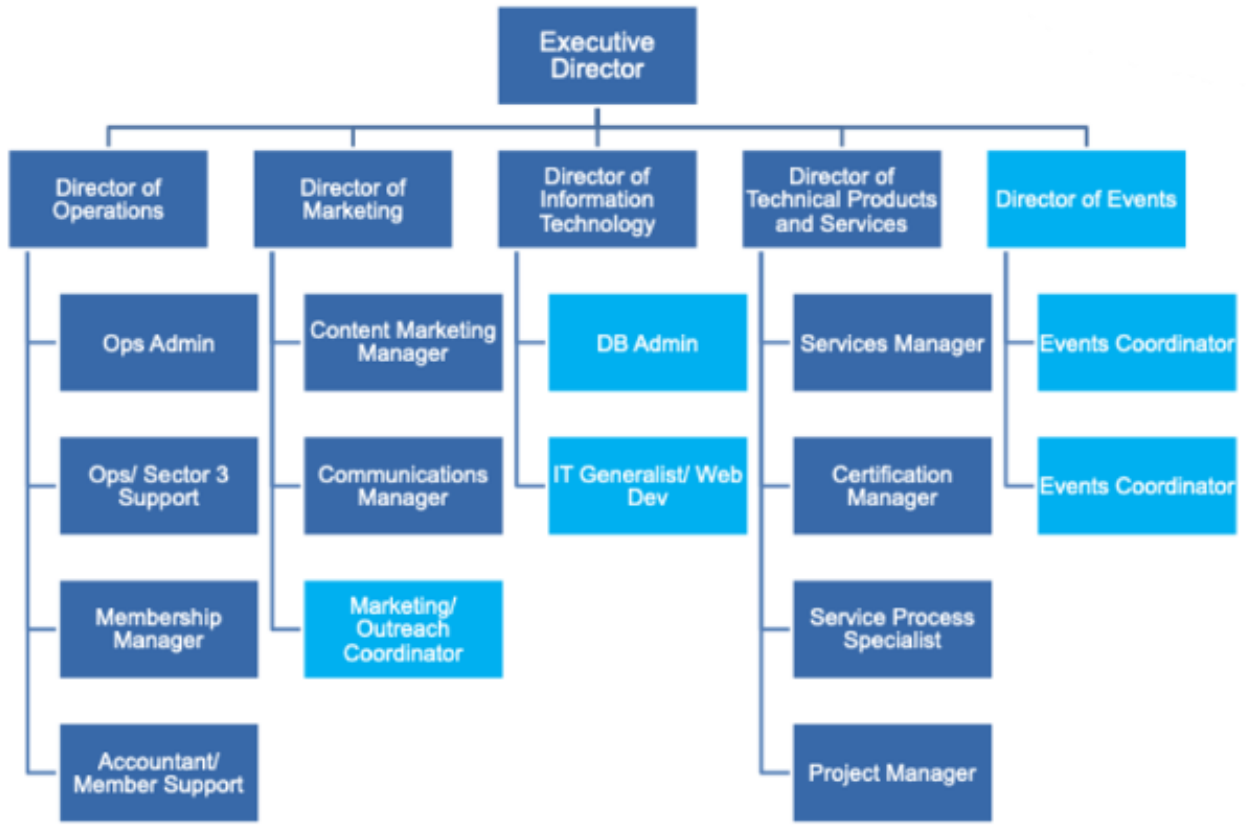
The above organizational chart shows the new staff structure. The light blue boxes reflect positions that have not yet been filled.

Read more about each of the staff members on the new INCOSE Staff Webpage, including their individual bios and the various ways that each of them can help support your volunteer efforts.

Welcome new INCOSE staff!

INCOSE Staff

Steve Records
Executive Director

Christine Kowalski
Director of
Operations

Honor Lind
Director of Marketing
and Communications

Jay McGraw
Director of
Information
Technology

Erika Palmer
Director of
Technical Products
and Services

Naina Vesudeva
Director of Events

Thomasine Okey
Operations
Administrator
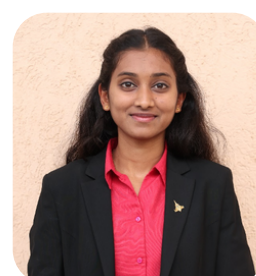
Meghana Mirle
Operations
Sector III Support

James Murray
Membership
Manager

John Hedrick
Accountant/Member
Support

Kelly Henseler
Content Marketing
Manager

Sam Bernal
Communications
Manager

Alex Kowalski
Services Manager

Courtney Wright
Certification
Manager

Danni DeRouche
Service Process
Specialist

Christian Sprague
Project Manager

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Chapter Updates

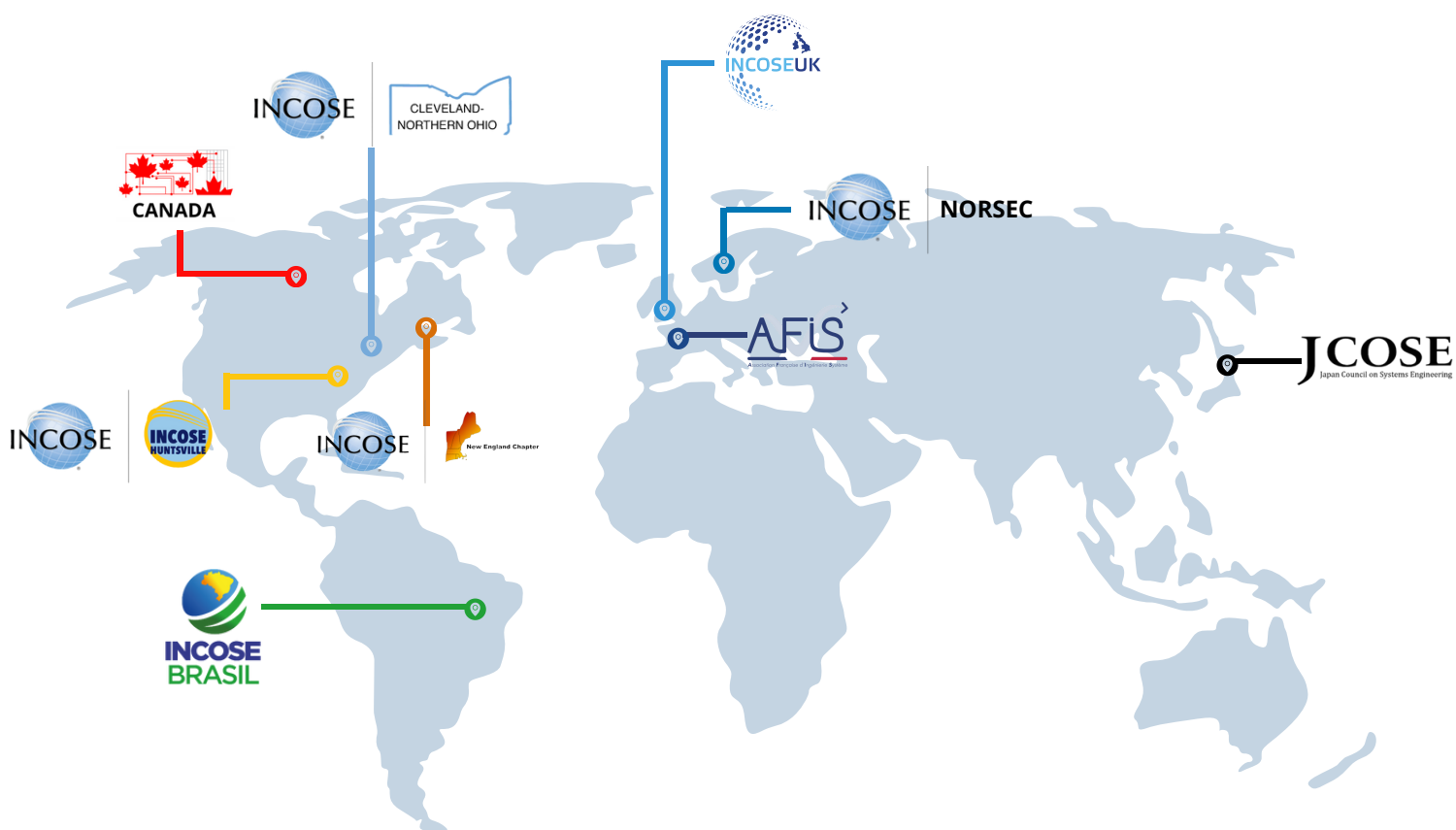Click on the chapter logo to go straight to their update

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INCOSE's Japan Chapter (JCOSE) Update

By Midori Daida

JCOSE was excited to hold the INCOSE Japan Symposium 2024 (JS 2024) hosted by JCOSE, on February 21, 2024. This was a hybrid event at Keio University in Yokohama, Japan, and online via Zoom. We were honored to feature two keynotes: one by David Hetherington of System Strategy, Inc., and another by Steve Records, the Executive Director of INCOSE. Additionally, the symposium included four expert presentations from various fields, including aerospace, that showcased the latest in systems engineering.

In our commitment to continuous improvement, we are actively reviewing JCOSE's purpose through dedicated discussion sessions. This initiative aims to refine our goals and better align with our members' needs. Keep an eye on the JCOSE website for updates, where we will share our clearer, more defined objectives.

JCOSE Website

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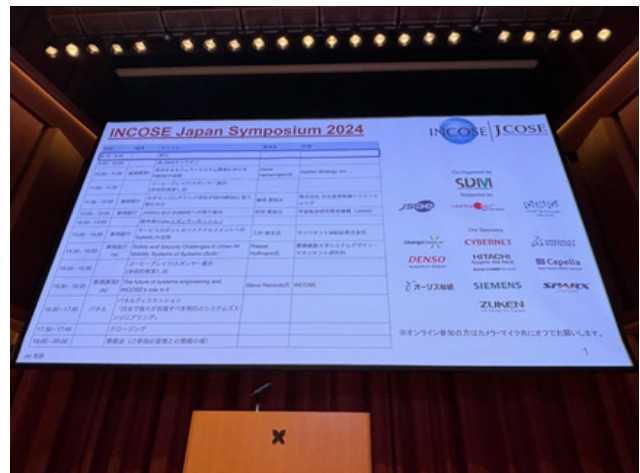
The Cleveland-Northern Ohio Chapter Partnered with Vitamix and NSBE to Promote SySTEAM

By Bill Kliner and Dennis Rohn

Over an eight-month period during 2023, INCOSE's Cleveland-Northern Ohio (C-NO) Chapter Members led an initiative to explore opportunities for promoting Systems, Science, Technology, Engineering, Arts, and Mathematics (SySTEAM) in Northeast Ohio and beyond. These efforts led to a collaborative partnership that delivered an engaging, interactive event for local high-school students.

Two long-time members of the C-NO Chapter, Carl Dister and Bill Klinger, sought ways for the chapter to conduct Systems Thinking Projects that benefit "social good" in the region. In early 2023, they connected with the Greater Cleveland National Society of Black Engineers (NSBE) Jr. Chapter, which promotes Science, Technology, Engineering and Math (STEM) to K-12 students.

Spurred on by the INCOSE SySTEAM Mini-conference held in July 2023, planning

began in earnest to determine how the Chapter could help promote SySTEAM to the NSBE Jr. Chapter participants. After numerous discussions with stakeholder organizations (the INCOSE SySTEAM Initiative Program Director, NSBE, the Greater Cleveland NSBE Jr. Chapter, the Vita-Mix Corporation, and the C-NO Chapter) consensus was that the initial activity would be a SySTEAM event during one of the NSBE Jr. Chapter meetings.

The event was held the morning of Saturday, December 9, 2023, on the campus of Case Western Reserve University, in Sears think[box]—claimed to be "the largest open-access innovation center and makerspace in the United States." Following introductions and customary NSBE Jr. activities, the INCOSE C-NO Chapter + Vitamix team conducted a focused SySTEAM experience for some 24 high school students.

The Vitamix-INCOSE Team (from left to right): Ashley Gowens, Carl Dister, Dennis Rohn, Catherine Vermeersch, Adam Wilson, and Mark Guinto. Not shown: Bill Klinger.

Team presentations gave historical background on the Vita-Mix Corporation, introduced concepts of Systems Thinking and Systems Engineering, touched on the engineering of components (and how they work together as a system), noted the art of industrial design, and listed key types of intellectual property, along with their legal importance.

Takeaways from those presentations were woven together by a Vitamix Chef who explained how SySTEAM principles are applied to create high-performance Vitamix blenders. He enlisted the students in three hands-on activities — making distinct mixes in the machines: a frozen dessert, a hot soup, and a fruit smoothie.

To vividly demonstrate fundamental scientific principles pertinent to their blender products, Vitamix furnished simple electric-motor kits that the students could take home and assemble, plus "Hand Boilers" that illustrate the effects of vapor-liquid equilibrium when activated by the heat of one's hand — which immediately caught the students' attention.

Following the success of this effort, the C-NO Chapter will consider broader ways to introduce SySTEAM to NSBE Jr. and other organizations.
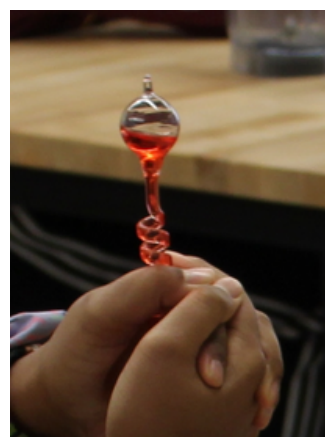
Cleveland-Northern Ohio Website

Carl Dister kicks off the event.

Dennis Rohn engages students in Q&A.

A simple electric motor sits to the left of a blender carafe

A so-called "Hand Boiler."

(photos by Bill Klinger)

Brazil Chapter: 2024 Systems Engineering Professional (SEP) Certification Cohort

By Raquel Hoffmann, Certification Director of INCOSE Brasil

The INCOSE Brazil chapter is launching the second cohort to support the community in preparing for the SEP exam. After the good results from last year's first cohort experience, more candidates will have the chance in 2024. Also, newly certified members who participated in the first cohort are now volunteers supporting the 2024 cohort organization. This time, we have 15 ASEP candidates and five CSEP candidates. The virtual meetings start in February and finish in May. The SEP exam is planned for the last week of May.

The schedule will cover the new version of the Systems Engineering Handbook in 12 weeks. An experienced guest is invited to speak about the week's theme and bring a more practical perspective to systems engineering processes.

In addition, we will provide quizzes, exam simulations, and additional material.

For the CSEP candidates, the cohort will also guide the application process and engage certified professionals from the community to review the candidate's CSEP form. The cohort is free for the INCOSE members, and we would like to thank all volunteers and invited guests engaged in this initiative.

Brazil Website

JOIN A LOCAL CHAPTER

Local chapters play an essential role in the achievement of INCOSE's goals and objectives!

incose.org/chapters

Huntsville Regional Chapter (HRC) Participates in Alabama's Future Cities Competition

By Tony Lindeman, ESEP-Acq, PMP

Bradley Biehn, INCOSE-HRC Special Events Director, and Keith McIntosh, participated in the 23rd Annual Alabama Regional Future Cities Competition on Saturday, January 20, 2024. The all-day event was hosted by Auburn University in Auburn, Alabama. The judging for the event had to be done virtually at the last minute due to treacherous weather conditions that made travel unsafe.

The Future Cities Competition exposes K-12 students to STEM and engineering career opportunities. Teams undertake a project that incentivizes them to think about solutions that could make the world a better place. Students are interviewed by groups of judges throughout the morning where they are asked to explain how they went about developing a solution for a future city

problem that is creatively represented by their student-constructed display.

The INCOSE-HRC sponsors a special award each year given to the project team that demonstrates the employment of a systems engineering approach to developing a workable solution to their future city problem. The Hampton Cove Middle School from Huntsville, Alabama, received this year's INCOSE-HRC Systems Engineering Award.

Huntsville Website

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Canada Chapter Updates

By Arman Nikkhah

Recent Events

Feb 11th - Leveraging AI in Systems Engineering (*Event Recording Link*)

This presentation provided:

- An overview of Artificial Intelligence (AI), Machine Learning (ML), and Data Science, defining their roles in simulating human intelligence, enabling systems to learn from data, and extracting meaningful insights. Emphasis is placed on the pivotal role of AI in Systems Engineering (SE) and exploring its contribution to various stages of the process.
- Examples to illustrate how AI enhances efficiency, predictive modeling, optimization, and decision-making, while addressing stakeholder needs.
- AI role in architecture and automation evolved in the system design process and the developing capacity of AI in SE and its potential future impact.

Jan 22nd - Strategic Insights: INCOSE Canada's 2023 Retrospective and Vision for 2024 (Event Recording Link)

An exclusive INCOSE Canada webinar where:

- The Board of Directors provided an in-depth review of 2023. This session examined our successes and challenges, offering insights into our strategic decision-making processes.
- Unveiled exciting initiatives for 2024 outlining both strategic and operational plans.
- Received attendees' thoughts on Canada Chapter planned technical program for 2024.

2023 Accomplishments

- Gained 17% growth in overall chapter membership level
- Hosted 11 technical events with great member participation rate
- Engaged in industry outreach by providing keynote speaker to AECOM's Systems Engineering Conference in June 2023
- Hosted workshops on 'Creating an Awesome Chapter Website' for other INCOSE Chapters
- Awarded Silver Chapter status for the INCOSE Chapter Circle Award 2023

Canada Chapter's initiatives for 2024

- Hold Systems Engineering Student Competition
- Participate in the 18th Annual IEEE International Systems Conference (Link)
- Hold in-person networking sessions
- Improve Canada Chapter's membership engagement
- Improve Canada Chapter's technical program

Canada Website

www.incose.org

WPI Engineering Ambassadors Promote STEM and Systems Engineering to Middle School Students

By Peter Huie

The Engineering Ambassadors Network (EAN) is a collaboration of engineering and STEM organizations from universities and colleges across the United States. WPI was one of the four founding schools of the Engineering Ambassadors program, developed in 2011 to address the challenges today's organizations face to recruit diverse, top-notch STEM engineering talent. The network has grown to 39 programs nationwide.

Through WPI's participation in the program, more than 22,000 students (about the seating capacity of Madison Square Garden) have been impacted by the STEM outreach activities offered by WPI Engineering Ambassadors. The presentations and hands-on activities serve as an eye-opener to young students on how engineering is intertwined with all facets of modern life. As a recent example, the Engineering Ambassadors offered a special program on Systems Engineering sponsored by the New England Chapter of INCOSE (International Council on Systems Engineering) in February 2024.

Systems engineering is an interdisciplinary field of engineering and engineering management that focuses on how to design, integrate, and manage complex systems over their life cycles. At its core, systems engineering utilizes systems thinking principles to organize this body of knowledge.

The New England Chapter of INCOSE exists to bring like-minded people together to celebrate and further Systems Engineering and Systems Engineers. They currently support Engineering Ambassador programs at both WPI and UConn.

From Left to Right: Peter Huie (External Relations), Tia Lee, Mikaela Milch, Fatimah Daffaie, Taya Yakovenko

Engineering Ambassadors Systems Engineering Special Program at WPI

100 students from Quinsigamond Elementary School visited the WPI campus in two groups during the week of February

5th, 2024, to learn about STEM and Systems Engineering. In typical fashion, the students arrived at the Rubin Campus Center Haglund Room bursting with questions about the autonomous robots they saw moving across campus. WPI Engineering Ambassadors, Taya Yakovenko (senior in Mathematical Sciences), and Fatimah Daffaie (junior in Biomedical Engineering), skillfully directed their excitement over the robots to the Systems Engineering presentation.

Using the assertion-evidence approach, Fatimah and Taya were able to actively engage students in a technical conversation and invited them to become Systems Engineers through an exercise that captivated their imaginations by creating an assembly line where they worked with their families and friends to build a large meal.

A hands-on activity, led by Tia Lee (senior in Mechanical Engineering) and Mikaela Milcha (senior in Computer Science and Data Science) connected the prevalence of Systems Engineering to Taya and Fatimah's presentation. In this activity, students worked in teams to figure out a Systems Engineering approach for assembling food packages for delivery. Through the activity, the Ambassadors worked hand in hand with Quinsigamond educators to help the students understand how the concepts used in the activity applied to Systems Engineering.

Following the hands-on activity, WPI Engineering Ambassador Emma St. Clair (sophomore in Mechanical Engineering) provided a college readiness talk that allowed the students to imagine a typical day in the life of a college student at a STEM

university. The program, as always, culminated in an ambassador led campus tour where students were able to experience campus life firsthand and say farewell to the beloved Gompei statue overlooking the WPI Quadrangle.

Engineering Ambassadors is a professional organization with an outreach mission. The hope is that someday these same Quinsigamond students will return to campus to cross the bridge as first year students and become Systems Engineers after crossing the bridge at graduation.

Partner with WPI today to sponsor the Engineering Ambassador program: https://www.wpi.edu/offices/external-relations/corporate-relations/employers-partners/engineering-ambassadors

Learn more about partnering with External Relations at WPI: https://www.wpi.edu/offices/external-relations

Learn more about Systems Engineering at WPI: https://www.wpi.edu/academics/departments/systems-engineering

Learn more about the New England Chapter of INCOSE (International Council on Systems Engineering): https://www.neincose.org/

New England Website

www.incose.org

Promoting Systems Engineering through our publications

By Jorge Da Silva
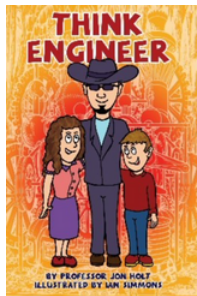
In 2015, INCOSE UK published *'Think Engineer'* a children's book that is aimed at 7-11 year-olds. As a result of this, in 2017 INCOSE UK published its next book, which was aimed at beginners in Systems Engineering and was titled *'Don't Panic! – The Absolute Beginners Guide to Model-based Systems Engineering'*. Not only was this an immediate hit, but it also launched the *'Don't Panic!'* series of books that now includes titles on: interface management, architecture and architecting, architecture frameworks, systems engineering services, integration and test and SysML 2.0. With four more titles in the pipeline, the *Don't Panic!* series continues to go from strength to strength.

Based on the success of the *Don't Panic!* series, we now have: '*Advanced Applications in Systems Engineering'* that currently has one book with two in development; '*Systems Engineering Education'* which includes the recently-released '*Adventures in Systems Engineering'* and a re-badged '*Think Engineer'*; and '*Systems Engineering Techniques'* that currently has a single title of '*TeamStorming'*.

As another exciting initiative, we have recently released our first translation of a book (*Don't Panic! The Absolute Beginners' Guide to MBSE*) into Japanese with two more titles also being translated by the Japanese Chapter of INCOSE (JCOSE). We are also working with other INCOSE Chapters worldwide to translate more titles to Dutch, German and Polish.

The publication arm of INCOSE UK is growing from strength to strength, and **we are always on the look out for new authors**, or just new ideas. Otherwise, if you are involved with an INCOSE Chapter who may be interested in translating any of our books into your language, then just get in touch. We have a robust and efficient publishing model in place with excellent royalty deals for authors and translators.

If you would like to know more, or are interested in getting involved in writing or translating books, please contact us at: **publications@incoseuk.org**.

Visit the INCOSE UK Online Store to purchase eBook or Paperback copies of our publications.

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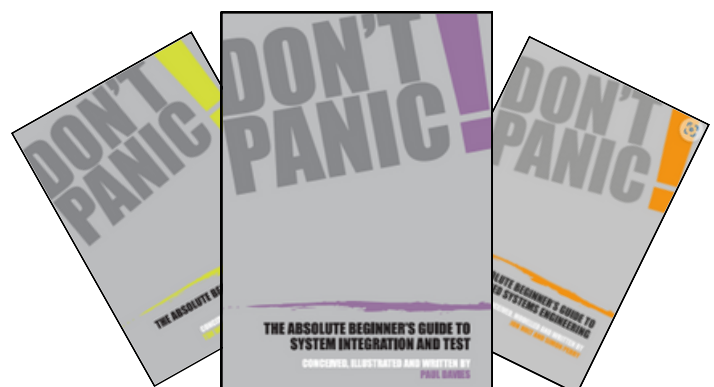
Endorsed Training Provider Courses

We have an exciting line up of online courses coming up this year. All courses are offered by INCOSE UK Endorsed Training providers covering a range of topics. Some of the upcoming courses are:

21 March 2024 - 1 Day / Online / £350 (+VAT)
Don't Panic! The Absolute Beginner's Guide to Architecture Frameworks Course by Scarecrow Consultants Ltd
Registration: https://bit.ly/424W2L3

12-14 June 2024 – 3 Days / Online / £1,150 (+VAT)
Systems Engineering Fundamentals Course by Burge Hughes Walsh Ltd
Registration: https://bit.ly/42xJCMf

See the full Endorsed Training Schedule on our website.

INCOSE UK Website

AFIS annual congress, January 16-18 2024, Cité Internationale Universitaire, Paris

AFIS, the French INCOSE chapter, held its annual congress from January 16 to 18, in Paris. This congress brought together French Systems Engineers from academia, industry, and government. More than 220 members and non-members participated for these three days, with the notable presence of Mr. Ralf Hartman, now INCOSE President, Mr. Steve Records, Executive Director, and Mr. Olivier Dessoude, Technical Operations Director.

support from the IEEE's French section.

During this event, RobAFIS (Robotics engineering and competition) involved eight teams of graduate students. The students had to develop their robots to fulfill specification given by the Program Committee, but also validate the behavior on the Congress site and demonstrate the quality of the robot Systems Engineering data during audits. Congratulations to the

The aim of this Congress was to gather people, share knowledge regarding projects, develop standards and technical committees carried out by AFIS, assess practices, and explore challenges and the future of Systems Engineering. For these reasons, the AFIS Annual Congress got technical

winning team from Institut Mines Télécom – Mines d'Alès!

Thesis prizes were awarded to three winners among 11 Ph.D. candidates: Mr. Emir Roumili Ph.D. (Contribution to the demonstration of nuclear safety in a context

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of model-based engineering: Methodological proposal), Mr. Victor Romero Ph.D. (An immersive, interactive and collaborative virtual environment for model-based design reviews) and Ms. Sophia Salas Cordero Ph.D. (Early phases of complex systems design: obsolescence considerations from the MBSE perspective).

Eight keynote speakers came to broaden the Systems Engineering horizon:

- M. Christian Refalo opened the keynotes with "The global approach" in the world of construction, with challenges related to long-lasting transport infrastructures and very large collaborations of engineering and complex organizations. Then, the audience had the chance to hear from M. Olivier Dessoude regarding the technical direction of INCOSE, whose main objective is to advance Systems Engineering on a global scale. This speech was followed by the presentation of M. Ralf Hartmann about INCOSE strategy and main initiatives status.
- On the day after, M. Marco FERROGALINI made a keynote about "What fundamentals for Systems Engineering in a Volatile, Unknown, Complex and Ambiguous world in full digital transformation?" Mikaël Le Mouëllic presented the Research & Development trends and the role of systems engineering in the future. Then, Ms. Louisette Rasoloniaina elaborated beyond the limits of current architecture practices with the idea that "there is perhaps a room for a middle way in terms of ecosystem architecture, which would allow us to overcome the limits of our current practices."
- On the third day, Agnes Mestreau explained how systems engineering is

performed and contracted at the European Space Agency. M. Frédéric Rosin shared his view on Industry 4.0 technologies to strengthen decision-making processes, evolving from an often very techno-centric vision towards a more human-centered approach, sustainability, and resilience.

Round tables discussed Human Resources in Systems Engineering, Artificial Intelligence with regards to Systems Engineering, and the safety of autonomous systems. The main conclusions are that System Engineering and training courses must be more attractive to engage young engineers, with more orientation towards thinking, analysis, and evaluation methods.

These threedays were also an opportunity to get an overview of the activities of the Technical Committees & Missions (Standardization, Model-Based Systems Engineering, Life Cycle Processes, safety & Security,Configuration Management, Human Factors, Sustainability, Certification, Training and Competencies, Systems of Systems,

Services, and Architecture), the starting one (Digital Transformation, and Systems Engineering of/with Artificial Intelligence products/technologies), and major ongoing projects:

- Systems Engineering reference system for extended enterprise (CRISEE)
- Best practices on requirement and ontology engineering
- Main evolution from version 4 to 5 of the INCOSE Systems Engineering Handbook
- Biomimetics and SystemsEngineering
- Human Systems Integration in Systems-Of-Systems
- Drivers for sustainable systems and responsible engineering
- Aligning stakeholders' roadmap in Systems-Of-Systems context
- Engineering of auto-adaptive systems along their life cycle
- Multi-Disciplinary Analysis and Optimization for Systems-Of-Systems
- Challenges and perspectives on Safety and validation of smart and autonomous systems
- Requirements on Human factors

During this Congress, with the INCOSE support, AFIS organized an INCOSE ASEP/CSEP certification session, allowing candidates to assess their Systems Engineering skills. Through a 130-minute exam, the eight candidates answered a 100-question quiz based on the Systems Engineering Handbook V4 and V5. Among them, three candidates passed.

The social event, with Steve Records' energizing speech, allowed the attendees to freely exchange and network while sharing the art of living "à la française"!

AFIS warmly thanks the INCOSE executives for their attendance, the organizing committee for the huge effort to achieve all the objectives, and our sponsors who made all these events possible (Airbus, Dassault Systèmes, Mathworks, BNAE, Capella, CIL4SysEngineering, Great Engineering, ISAE Supaéro, ISAE Supméca, IEEE France Section, SAGIP, S.mart, Visure Solutions).

By the AFIS Program Committee and Community Management.

For further information, please contact: communitymanagement@afis.fr or directiontechnique@afis.fr

AFIS Website

NORSEC Norway Chapter Updates for Fall 2023 and Spring 2024

NORSEC in collaboration with University of South-Eastern Norway (USN) has been regularly holding Systems Engineering Study Groups (SESG) at the University of South-Eastern Norway, Kongsberg, Norway. The objective of the meetings is to exchange experience between people who are interested in systems engineering or who have the intent to become a systems engineer. The SESG discusses one theme per meeting, and the subjects are one of many systems engineering aspects. There are two meetings held per year; one in Spring and another in Fall semester. NORSEC and USN collaborate together on the annual Kongsberg Systems Engineering Event (KSEE).

In November 2023, the theme was on *Revisiting what does the progress in AI mean for systems engineering?* It covered how the progress in generative Artificial Intelligence (AI), e.g. ChatGPT, has once more increased the buzz level of AI. The 30 participants explored how AI is actually being used today (for example to populate concept space, or as pattern recognition in systems) and what the consequences are for systems engineering (for the previous examples respectively speeding up and broadening in the early phase, challenges in qualification and certification).

Tobias R. Hylleseth, one of the speakers at SESG Fall 2023

The participants also engaged in workshop activities and discussions.

One of the teams presenting their findings

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The Feb 2024 participant group

The most recent session was held in February 2024 and the topic was: *Perspectives on Digitalization*. Many companies see the technological advances in digitalization, from big data to AI, from MBSE to digital twins, from IoT to Industry 4.0 or 5.0, etc. However, most of these companies are still exploring what they may do to stay competitive in this fast-changing world. In this SESG, several alumni who studied this topic during their master's project were asked to give their current vision on digitalization.

To learn more about previous and upcoming sessions, visit the Systems Engineering Study Group (SESG) (gaudisite.nl) webpage.

The next Kongsberg Systems Engineering Event for 2024 is scheduled for 12th June (start @15:00) to 13th June (ends @ 12:00).

For more details see www.usn.no/KSEE2024.

KSEE 2024: Revisiting what does the progress in AI mean for Systems Engineering?

Date: 12 June - 13 June
Time: 15:00 - 12.00
Location: Kongsberg

Learn more

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20th Anniversary of INCOSE's Certification Program

By Courtney Wright

INCOSE's Certification Program celebrates its 20th anniversary in March 2024! The program that started with just one level of certification now has three, covering every stage of an engineer's career. There are currently over 4,000 certified Systems Engineering Professionals (SEPs), as of 1 January 2024:

- 1,629 Associate Systems Engineering Professionals (ASEPs)
- 2,409 Certified Systems Engineering Professionals (CSEPs)
- 344 Expert Systems Engineering Professionals (ESEPs)

In the past year, the Certification Program has made several updates to improve the experience for candidates around the globe. ASEPs still have an easy path to certification, only needing to meet the knowledge requirement. They now have more ways than ever to meet that requirement, with online exams, in-person exams, and 22 Academic Equivalency paths. In the first quarter of 2024, INCOSE approved its first European Academic Equivalency for Queen Mary University of London.

CSEPs benefit from a removal of the minimum reference requirement. They now can submit with any number of qualified references, so long as those references confirm their systems engineering work experience.

Both CSEPs and ESEPs are no longer required to submit transcripts of diplomas. In some instances, confirmation of a qualifying degree may be requested.

Finally, the biggest change has been to allow ESEPs to perform their technical leadership interview through written submission, rather than a live, oral interview. ESEP candidates may still choose to have an oral interview.

The requirement changes are to reduce disadvantages for candidates with native languages other than English.

All SEPs are required to be INCOSE members, and approximately one-third of all INCOSE individual members are certified. Certified individuals represent a significant part of the systems engineering community, especially because the population of certified members is exceptionally ambitious and diverse. As the Certification Program looks to its next 20 years, it will remain relevant for its current SEPs and attract a broader membership of systems engineers to INCOSE.

"

I participated in the first CSEP beta exam and was one of the first to earn CSEP in 2004 and I earned my ESEP in 2011. Having moved from industry into training and consulting, the INCOSE certifications have proven to be invaluable in helping me establish credentials with clients. In addition, I had the privilege of being the INCOSE Certification Program Manager in its formative years from 2007 to 2013. Increased awareness and organizational agreements paved the way for significant growth during this period.

- Dave Walden, ESEP

"

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Member Spotlight: Dr. Udhaya Kumar Dayalan

Dr. Udhaya Kumar Dayalan has been serving as an Engineering Manager at Trane Technologies for more than 15 years. His role involves overseeing complex engineering projects, which requires strategic thinking, technical expertise, and effective team management. He is an alumnus of the University of Minnesota, USA where he received his Masters in Software Engineering and Doctor of Philosophy in Computer Science and Engineering, and has been an active member of INCOSE since 2016.

Dr. Dayalan's contributions to the industry include 36 patents filed in the USA, Europe, and China, and 10+ publications in esteemed journals, primarily focusing on IoT, 5G, and Machine Learning, demonstrating thought leadership and expertise. He is an advisory panel member for the Customer Experience Certificate Program at Minnesota State University, Mankato. His involvement in shaping educational programs reflects leadership in knowledge dissemination. He holds the title of Senior IEEE Member and is a proud INCOSE Certified Systems Engineering Professional (CSEP). He is also serving as the Director of Academia & Government for the INCOSE North Star Chapter as part of the leadership team.

In addition to his noteworthy research and innovative solutions in HVAC, IoT, and 5G Networking, he has offered his expertise as a reviewer at several top IoT, Networking, and Technology conferences, workshops, and forums. His expertise in the field has led to numerous invitations to serve as a peer reviewer and has been a part of the technical program committee for over 170 conferences worldwide. He showcases leadership in shaping industry discourse and has served as chair and keynote speaker at several conferences, further solidifying his leadership. These responsibilities involve setting the tone for conferences, fostering collaboration, and sharing insights with a global audience.

In 2023, Dr. Dayalan was first author on three published papers:

1. PRAVEGA: Scaling Private 5G RAN via eBPF/XDP, eBPF and Kernel Extensions, ACM SIGCOMM 2023, USA, September 2023
2. Kaala 2.0: Scalable IoT/NextG System Simulator, IEEE Network, Volume: 37, Issue: 3, May/June 2023
3. Towards an eBPF+XDP based Framework for Open, Programmable and Scalable NextG RANs, IEEE Future Networks World Forum (FNWF) 2023, USA, November 2023

When asked how his INCOSE membership played a role in his career advancement, he said that not only did it allow him to earn his highly-valued CSEP certification, but it also helped him connect with fellow systems engineers across the world through engagement with his chapter and at

INCOSE events.

Being an actively engaged member of the North Star Chapter for more than six years has helped him build a professional network, connect with other members from other companies, be mentored, and help mentor others. Dr. Dayalan's multifaceted leadership roles, technical contributions, and active engagement within INCOSE and the broader systems engineering community exemplify his impact and influence in the field.

Thank you, Dr. Dayalan, for all the work you do with INCOSE and the global systems engineering industry!

Are you an INCOSE member doing great work in the systems engineering community?

Let INCOSE spotlight you in an upcoming newsletter!

Email newsletter@incose.net indicating your interest and our MarCom Staff will be in touch.

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Not For Women Only – Using the Professional Competencies to Improve Your Delegation Skills

By Dr. Heidi Hahn

In a December 14, 2023 article in The Economist, Bartleby praises delegation as freeing up senior managers to devote time to issues for which their attention is critical; increasing autonomy and satisfaction; and achieving organizational benefits due to faster decision-making by people who are best informed on the topic. He notes, however, that delegation "is a minefield."

Some managers don't delegate at all. Others do, but do so for the wrong reasons. Bartleby cites two studies in which the motivations of the delegators were far from pure. In both cases, the researchers found that people were more likely to delegate in dicey situations, such as for tasks with demanding performance requirements, and to hold on to tasks where performance targets are easier to attain. More commonly, managers do something akin to faux delegation – they delegate but don't give the people to whom the task was delegated autonomy to complete it.

Bartleby suggests that managers use an explicit decision-making framework to determine which decisions can be delegated and which cannot. He describes Jeff Bezos' distinction between type-1 decisions, which are important and irreversible, and type-2 decisions, which may still be important but can be reversed if necessary. Type-2 decisions are amenable to delegation for

quick action by small groups.

Having a decision framework for delegation is a fine start, but it seems to me that there are other competencies that would be helpful in facilitating effective delegation. The self-awareness, self- regulating, and motivation aspects of Emotional Intelligence (EI), which Presland (ed. 2018, pg. 51) defines as "the ability to monitor one's own and others' feelings, to discriminate among them, and to use this information to guide thinking and action," should help counter managers' instincts to delegate for selfish reasons.

Communication is also an essential competency for successful delegation. Specifically, the delegator needs to properly encode the instructions in the message and ensure that the receiver has gotten the decoded content in the way that the delegator intended, recognizing that there are barriers such as personality, perceptions and interests, and attitudes and emotions that can prevent this from happening. The delegator should solicit feedback from the receiver and may need to revamp the message to convey the intended content more clearly.

When delegating to a new team member, the delegator should exercise the coaching aspect of the Coaching and Mentoring

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Professional Competency. This involves training and supervising the person for a specific and short-term purpose, to improve their performance and develop skills (KeyDifferences.com, 2018).

Finally, facilitation, which is defined as "the act of helping others to deal with a process, solve a problem, or reach a goal without getting directly involved" (Presland, ed., 2018, pg. 50) creates an environment that enable individuals and groups to achieve their goals. Facilitation is about helping people gain skills and knowledge. To facilitate successful delegation, identify areas of improvement in the tools, resources, structures, and processes provided to enable an open, collaborative work environment; optimize workflows and processes, eliminating roadblocks from existing processes; and perhaps most importantly, empower teams to act autonomously when necessary (Zavvy, 2022).

In summary, the keys to successful delegation are:

- Have a decision-making framework that provides guidance regarding what can be delegated and what cannot

- Use your EI to reflect on your motivations and self-regulate to ensure that you are delegating for a legitimate reason rather than from a base instinct

- Communicate the task to be delegated clearly and confirm that the receiver has received the delegation instructions as you intended

- Coach new delegatees on expected behaviors and outcomes
- Facilitate an environment that enables delegatees and teams to perform the delegated task successfully

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Industry Thought Leader, Dr. Azad Madni, Gordon Prize Winner

Dr. Azad Madni, INCOSE Member and Life Fellow, was awarded the prestigious Gordon Prize for Innovation in Engineering and Technology Education by the National Academy of Engineering (NAE). This accolade recognizes his groundbreaking work in developing novel educational programs that integrate engineering with other disciplines, such as medicine and business, to address complex societal challenges.

This achievement is added to his list of over 100 awards, including the INCOSE Outstanding Systems Engineering Educator Award, the INCOSE Founders Award, and the INCOSE Pioneer Award. Dr. Madni is also one of only two people to receive the INCOSE Benefactor Award!

To read more about Dr. Azad Madni and his groundbreaking work, visit the Global Indian's article or watch his interview on USC Viterbi's YouTube channel.

You can also follow Dr. Madni on his LinkedIn and his website.

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New Special Features for the Professional Development Portal (PDP)

By Kelly Henseler

If you haven't been to the Professional Development Portal (PDP) recently, you may have missed some recent new features!

New Detailed Competency Self-Assessment

In addition to the Basic Competency Self-Assessment, there is now a new Detailed Competency Self-Assessment. The detailed assessment uses the competency area/proficiency level tables from the Systems Engineering Competency Assessment Guide (SECAG) and includes sub-indicators for knowledge (K), activity/ability (A), and professional attitude/behavior (P).

What is a competency?

A competency is an observable, measurable pattern of skills, knowledge, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully.

Why is assessing your systems engineering competency important?

Certain competencies are typically required at different levels of proficiency, depending on a specific work role or occupational function. Knowing one's competency level can help ensure that individual and team performance aligns with the organization's mission and strategic direction.

Which assessment is for you and how do you take it?

Anyone can take the basic self-assessment, but only INCOSE members and Corporate Advisory Board (CAB) Associates can conduct the detailed SECAG self-assessment.

For more information on both competency self-assessment options, a "How To" document, and a video recording of a demonstration of the PDP and its assessments visit the PDP's Competency Page.

Core Competencies
Core competencies underpin engineering as well as systems engineering.

| SYSTEMS THINKING | LIFECYCLES | CAPABILITY ENGINEERING |
| GENERAL ENGINEERING | CRITICAL THINKING | SYSTEMS MODELING AND ANALYSIS |

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Professional Competencies

Behavioral competencies well-established within the Human Resources (HR) domain. To facilitate alignment with existing HR frameworks, where practicable, competency definitions have been taken from well-established, internationally-recognized definitions rather than partial or complete re-invention by INCOSE.

COMMUNICATIONS	ETHICS AND PROFESSIONALISM	TECHNICAL LEADERSHIP
NEGOTIATION	TEAM DYNAMICS	FACILITATION
EMOTIONAL INTELLIGENCE	COACHING AND MENTORING	

Management Competencies

The ability to perform tasks associated with controlling and managing Systems Engineering activities. This includes tasks associated with the Management Processes identified in the INCOSE SE Handbook, as well as systems engineering.

| PLANNING	MONITORING AND CONTROL	RISK AND OPPORTUNITY MANAGEMENT
DECISION MANAGEMENT	CONCURRENT ENGINEERING	BUSINESS AND ENTERPRISE INTEGRATION
ACQUISITION AND SUPPLY	INFORMATION MANAGEMENT	CONFIGURATION MANAGEMENT

Technical Competencies

The ability to perform tasks associated primarily with the suite of Technical Processes identified in the INCOSE SE Handbook.

REQUIREMENTS DEFINITION	SYSTEM ARCHITECTING	DESIGN FOR...
INTEGRATION	INTERFACES	VERIFICATION
VALIDATION	TRANSITION	UTILIZATION AND SUPPORT
RETIREMENT		

Integrating Competencies

This competency group recognizes Systems Engineering as an integrating discipline, joining activities and thinking from specialists in other disciplines to create a coherent whole.
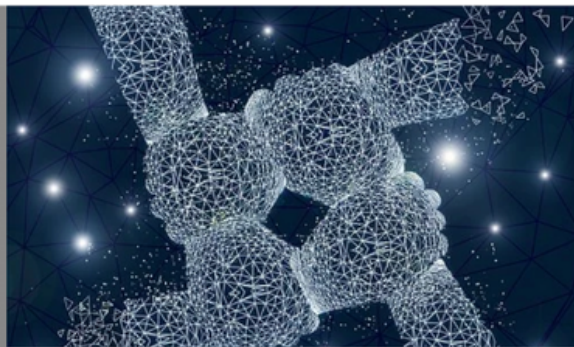
PROJECT MANAGEMENT	FINANCE	LOGISTICS
QUALITY		

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There are now over 330 discounted e-learning courses from MindEdge on the PDP. Courses cover a range of subjects including:

- Business Negotiation
- Body Language in Business
- Law and Legal Ramifications
- Lean Six Sigma
- Corporate Social Responsibility
- HR Management
- And so much more!

It's important to build skills outside your technical domain to work towards leadership roles and open doors to new career possibilities. Finance literacy can help you evaluate project costs, propose solutions aligned with budgetary realities, and become a fiscally responsible business partner. Marketing skills equip you to translate complex technical jargon into tangible business benefits, securing buy-in from stakeholders who may not speak your domain's language. Project management expertise empowers you to lead cross-functional teams, manage timelines efficiently, and navigate the intricacies of organizational dynamics.

In short, building your skills outside of systems engineering is how you can bridge the gap between your technical expertise and your business impact and value.

INCOSE's partnership with MindEdge can help you hone these skills at a discounted price!

Browse the PDP's catalog for more information and to register for a course today!

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SYSTEMS ENGINEERING

1422 Learning Resources

Leveraging the INCOSE-TUS Model for Smart City Development in Darkhan, Mongolia

By Jargalsaikhan Dugar, Head of Young Researchers Supporting Foundation and Mend-Amgalan Puntsagnamjil, Dean for Research & International Affairs of Mongolian University of Life Sciences

Darkhan, a small yet significant city nestled within the expansive landscape of Mongolia, holds the distinction of being the country's second-largest urban center. This is particularly noteworthy given Mongolia's reputation as one of the most sparsely populated nations globally, with a population exceeding three million. Despite its prominence, Darkhan grapples with a host of pressing challenges. These challenges include environmental pollution, high unemployment rates, aging infrastructure, and the ramifications of shortsighted populist fiscal and social policies—a complex issue intricately linked to the country's political and electoral systems.

In 2022, TUSS, a distinguished Mongolian systems engineering company, orchestrated a workshop in Darkhan. This event was conducted in collaboration with the University of Agriculture, situated within the city. The primary aim of this workshop was to explore the potential application of social systems engineering tools in the realm of urban development. During this workshop, civic leaders were introduced to the INCOSE-TUS model, and the University was tasked with evaluating its applicability in the context of city planning and operations.

Subsequently, Darkhan embarked on a collaborative venture with the European Union (EU), with the objective of formulating a comprehensive city development concept. In 2023, two separate research teams were assembled to construct an integrated city development model. This model sought to harmonize established developmental policies with a systems-based approach. The first team, comprised of researchers from the Mongolian National University, was entrusted with formulating a development plan rooted in spatial planning — a well-established paradigm in community development planning. The second team, composed of researchers from TUSS-affiliated companies and a non-governmental organization (NGO), was tasked with devising a model for Darkhan city, drawing inspiration from the INCOSE-TUS model.

The city administration initiated commendable efforts to facilitate effective coordination between these two research teams, recognizing the potential for productive synergies. Notably, joint sessions emerged as highly efficient platforms for collaboration and consensus-building.

Both teams are expected to deliver their final findings in the first half of 2024. Insights garnered from the last three months of

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INCOSE-TUS Model

Max Neef's human fundamental needs
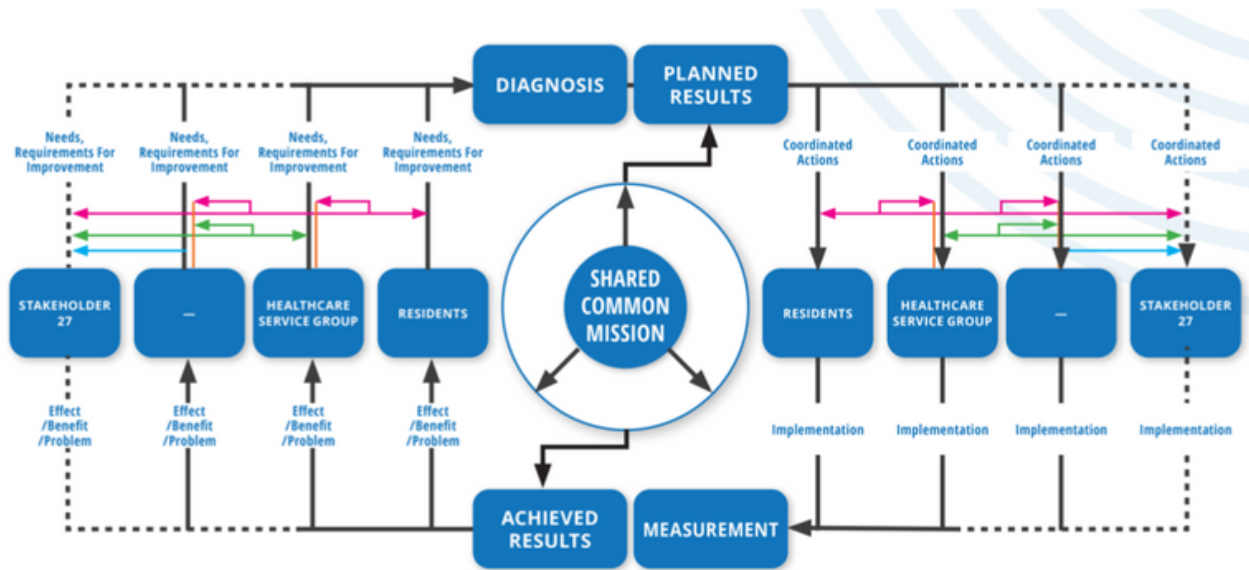
intensive work have already yielded valuable observations. Analysis conducted by the TUSS-led team has brought to light the absence of a shared mission capable of unifying all city stakeholders and residents.

Additionally, this analysis has underscored the prevalent tendency among the city's residents and officials to conflate the concept of a city with that of its municipal government. Extensive consultations with city officials enabled the team to successfully convey the imperative of developing a new definition of the city concept and establishing a clearly delineated and universally embraced mission.

In this endeavor, the INCOSE-TUS model has played an indispensable role, providing a logical foundation for constructing a conceptual framework for a "smart" Darkhan city.

Moreover, the model's definitions of a city and "smartness" have garnered enthusiastic endorsement from city officials. Furthermore, a taxonomy based on universal human fundamental needs, proposed by Max Neef

and employed within the INCOSE-TUS model, served as a compelling factor in articulating a shared mission for the city.

However, the introduction of newly proposed paradigms, integral to the construction of the INCOSE-TUS model, posed a formidable challenge when communicating these concepts to city leaders and securing consensus regarding the necessity of a fresh mental model for city planning and management.

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City officials expressed satisfaction with the INCOSE-TUS model's stakeholder grouping model and well-being index. Consultations with these officials highlighted the need for meticulously crafted mission statements for each grouping of stakeholders. Consequently, the TUSS-led team was entrusted with the task of formulating such mission statements. The process of crafting mission statements for interacting stakeholder groups necessitated a systematic approach. To this end, the model of the system of systems developed by TUSS, based on GEMA-5 (Goal Enforcement Mandatory Axioms), proved to be exceptionally valuable. GEMA-5 serves as a formal system model, systematizing interconnected axioms applied in the pursuit of goal realization activities.

The shared mission statement of a "smart city," as developed through the INCOSE-TUS model, was adopted as the central framework for delineating the mission statement for the city of Darkhan. This framework was further enriched by two considerations:

- Reflecting the comparative advantages in geography, economics, and societal dynamics enjoyed by the city.
- Aligning the city's mission with the broader mission of Mongolian society, as defined by the Constitution of Mongolia.

By integrating the city's mission into the broader societal mission, alignment with the principles and frameworks governing the entire society was achieved. This facilitated the creation of a robust platform for consensus-building and addressing a

diverse array of issues. It is worth noting that Article 16 of the Constitution of Mongolia delineates fundamental human rights that must be guaranteed by the state, and these rights align harmoniously with the universal human fundamental needs defined by the Max Neef taxonomy.

The TUSS-led team benefits significantly from the city's initiative to conduct two distinct research projects concurrently, with independent teams focusing on the same subject matter. This initiative affords the TUSS-led team the opportunity to compare its findings with those of the other team, conducting a comprehensive analysis of both differences and similarities. Most importantly, it enables the development of a strategy for integrating these findings into a unified development concept. Thus far, open discussions and consultations between the two teams have revealed no fundamental logical conflict between their findings, indicating that the INCOSE-TUS model holds substantial potential as an efficient tool for integrating various activities, including project planning, among all stakeholders. This integrated approach can serve as a powerful means to realize a collectively shared goal.

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Tools Integration & Model Lifecyle Management (TIMLM): Connecting the Dots to Enable Model-Based Systems Engineering (MBSE) Interoperability for Cross-Company Collaboration

By Juan C Mendo, TIMLM WG Co-chair

The industry is evolving from written requirements and schematics to Digital Systems Models. Digitalization brings more MBSE collaboration opportunities between companies with the promise of streamlining certification and product delivery, enabling development assurance for critical systems and reducing development and production costs.

But only a small percentage of this potential is being realized with MBSE today. One of the biggest challenges is enabling digital continuity when the design and testing of the product are outsourced to system suppliers.

Some real MBSE collaboration examples are:
- An original equipment manufacturer (OEM) receives a .mdzip SysML model from a supplier but cannot integrate it with the higher-level architecture due to a lack of understanding of the operational use cases being modeled. This happened since a SysML framework was not previously agreed upon between companies.
- OEM and supplier co-developed a joint SysML model, however legal intellectual property (IP) ownership is not clear since system scope and boundaries were not defined beforehand.
- The supplier has delivered several control and multiphysics behavior models in .FMU format, used to verify and validate the supplied system; however, no metadata such as the co-simulation details, the design intent, or the model constraints has been included. Rework and cost assertions occur as a result.

SysML V2 brings great opportunities for MBSE interoperability between SysML tools. However, MBSE encompasses a higher layer of models that need to integrate to represent a consistent, cohesive system specification and/or system design. This is due to the cross-domain nature of MBSE.

Such a cohesive MBSE model set is often referred to as a "Technical Data Package" (TDP) or "Digital Data Package" (DDP) in the Aerospace and Automotive Industries.

This new embodiment of a modern, digital TDP includes a validated set of models with the right format, the right context metadata, model links, and visualization mechanisms.

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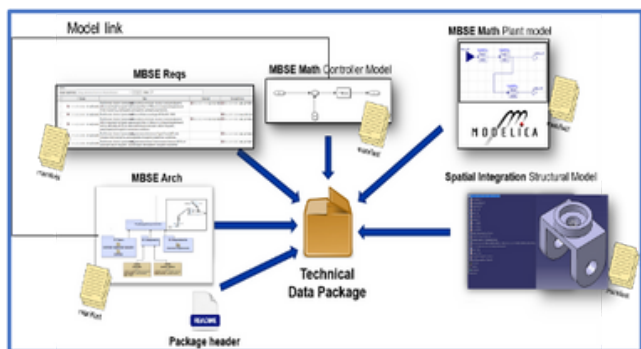
Example of a "Technical Data Package" or "Digital Data Package" for an Aerospace Actuation system.

A set of collaboration agreements or model development plans, as well as a collaboration workflow, must be defined, including the identification of the system scope and boundary, the modeling methods, a process for common change and configuration, and agreed IP protection mechanisms.

However, it is really the level of synchronization between companies that defines the difference between collaboration or co-development and a simpler exchange or transaction. Tighter engagements require more advanced capabilities but return opportunities for much earlier system integration and first-time quality. Thus, the need to classify engagements and use cases

is evident and has been documented in the *Supplier Engagement Framework* below.

Existing TDP metamodel standards, such as OMG's SpecIF and DDP, define the semantics for the integration of the models within a TDP. A new OMG project seeks to align semantic metamodels and provide a unified solution. MoSSEC ISO AP243 defines the context metadata that enables integration and collaboration.

Multiple standard associations across the globe are realizing the real need to standardize what to share and how to share, for a modern, digital TDP. Industry alignment, including users, vendors, and academia, is key for a truly collaborative digital transformation.

The INCOSE TIMLM WG is leading the establishment of an MBSE Interoperability Forum or MBSE-IF, with participation from Association Française d'Ingénierie Système (AFIS), L'Association Française d'Utilisateurs du net (AFNeT), Gesellschaft für Systems Engineering (GfSE), PDES Inc., LOTAR International, and ProSTEP IVIP. The MBSE-IF is an international consortia
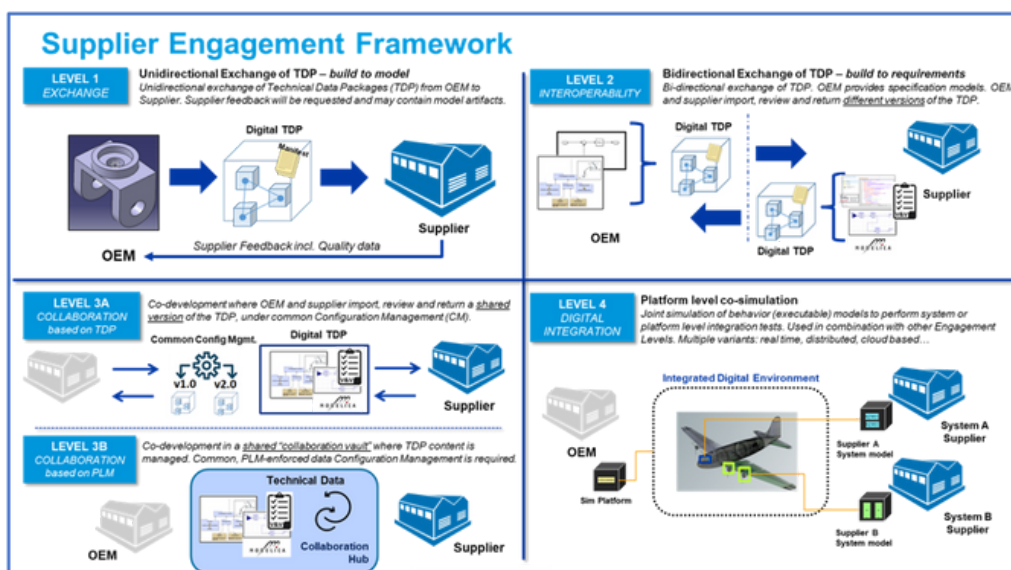
The Supplier Engagement Framework classifies OEM – Supplier Collaboration Use Cases

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team of users and software vendor community that will shape the use cases and will test and deploy standard digital TDP solutions.

These new OMG and ISO standards and the new MBSE-IF community are the industry enablers for end-to-end digital continuity of the extended enterprise, which includes OEM and suppliers.

We would like to learn about your MBSE collaboration use cases. Please, don't hesitate to reach out to us, participate, and help us shape the future of MBSE.

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Requirements Working Group Update

By Lou Wheatcraft

The International Workshop (IW) 2024 was very productive for the Requirements Working Group (RWG). During Saturday morning's Opening Plenary, the RWG was presented the Sustained Performance Award for 2023 and Tami Katz was presented the Outstanding Service Award. The RWG had an afternoon session on Saturday and two half-day sessions on Sunday. The RWG leadership and members then used the other days and times to attend other IW2024 sessions and collaborate with other WGs.

The Saturday session was standing room only. We started out with introductions. It was good to see the number of attendees where this was their first IW they had attended and their interest in needs, requirements, verification, and validation across the system lifecycle. An overview of the RWG was presented discussing what the RWG is about, our web page presence, presentations on the INCOSE RWG

YouTube Channel, our Viva Engage community, our products, our outreach activities, and how to become a member of not only the RWG, but also other WGs of interest.

As part of this presentation, we discussed our change of leadership roles and the addition of two new co-chairs. Tami Katz is stepping down to be a RWG Co-Chair enabling her to fulfill her duties as the new Deputy of Tech Ops and Lou Wheatcraft is assuming the role as Chair. During this meeting, Lou presented Tami with a certificate of appreciation for her leadership and hard work as Chair over the last four and a half years.

Along with the current co-chairs, Mike Ryan and Kevin Orr, the RWG expanded our leadership with two new co-chairs: Jeffery Williams and Katarzyna Kot. Jeffery has an extensive background in the practice of systems engineering and is an Adjunct Professor at the University of Alabama in Huntsville teaching college courses in

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systems engineering with a focus on Model-Based Systems Engineering (MBSE). Katarzyna is an independent consultant and business analyst working in the Netherlands. She helps organizations enhance their needs and requirements definition and management practices, and she provides training on needs and requirements for her clients. Her focus is on successfully developing software applications and embedded software from the perspective of needs and requirements.

Next, we reviewed the RWG 2023 accomplishments which included: conducting monthly meetings, providing presentations to various INCOSE chapters and regional conferences, collaboration with other WGs, the release of version 4 of the Guide to Writing Requirements (GtWR), updates to the Needs and Requirements Manual (NRM), additions to the presentations on our INCOSE RWG YouTube channel, and contributions to updating the SEBoK areas dealing with needs and requirements. During 2023, our Viva Engage community has grown to almost 1200 members; clearly illustrating the importance of needs, requirements, verification, and validation across the system lifecycle.

We then presented our plans for 2024 which include: Wiley publication of the Needs and Requirements Manual (NRM) v2, further updates to the SEBok, continued collaboration with other WGs, continue RWG monthly meetings but conducting them at two different times in order to better serve our worldwide membership, continue to add presentations and educational videos to the RWG YouTube Channel, develop guidance on the legal use of our products, develop guidance and a road map for using videos on the RWG YouTube Channel for education

and training, and the development of new whitepapers and guides that elaborate on activities discussed in the NRM, tailoring them to specific domains.

One of the new initiatives discussed is to develop a "Guide to Model-based Needs and Requirements". During the discussions, a proposal was made to develop a "Guide to Embedded Software Needs and Requirements" that tailors the concepts and activities defined in the NRM to the development of embedded software. It was also proposed that we develop a "Guide to Agile Needs and Requirements" as well. In doing so we would integrate systems engineering best practices discussed in the NRM with the strengths of the intent of Agile. In doing this we will collaborate with the Agile Systems and Systems Engineering WG and Systems and Software Interface WG.

To provide more participation opportunities for RWG members, we discussed the addition of adding a third leadership layer consisting of project managers of proposed new activities and products. For new initiatives or products proposed by members, a project manager will be named who will form a team of members interested in a specific initiative to write a whitepaper or develop a new product.

The rest of the Saturday session was devoted to open discussions concerning questions from those attending the session concerning challenges they are having concerning needs, requirements, verification, and validation across the lifecycle.

The Sunday morning session was a repeat of the Saturday afternoon session discussed

above. The afternoon session was devoted to assessing poorly written requirements, identifying the defects, and writing an improved version of the requirement without the defects. This activity was very popular and generated a lot of discussion and engagement of the attendees.

If any of the readers have a specific topic of interest they would like to learn more about, help with, become more involved in, or to suggest a discussion topic at one of our monthly meetings, let the RWG leadership know at requirements-leaders@incose.net.

Check out the Requirements Working Group's Youtube Channel:

RWG's next monthly meeting:

Managing "Tough" Requirements

"Tough" requirements are difficult to be elicited, agreed, formally expressed, verified, validated and furtherly managed, are a constant in the day-to-day job of a Systems Engineer. They are obviously worthy of special attention during the overall project and system lifetime. They tend to expand their influence across programs, technical best practices and are difficult to be changed or overcome. This talk is based on the Needs and Requirements, Writing Requirements and Verification and Validation guides, an overview enriched by real cases on the professional experience of a Systems Engineer, aiming to share an open dialogue with the participants.

Presenter: Carlo Leardi, CSEP, graduated in electronic engineering in Genova Italy. Carlo deals with Quantitative Systems Engineering on a day-to-day application and coaches a full range of statistical and simulation methodologies supporting the decision process. He published several articles in Engineering and Systems Engineering journals. He is one of the founders and former president of the INCOSE Italian Chapter and founder of AISE, the Italian association of Systems Engineering. He taught at the Systems Engineering Masters in Tor Vergata and ForteMare in La Spezia.

When: Thursday, March 28, 2024 at 12 PM and 4 PM Central Time USA

Register: 12 PM (CDT) Zoom Registration
4 PM (CDT) Zoom Registration

SysML v1 to SysML v2 Transition Guidance Project

By Frank J. Salvatore, OCSMP, Six Sigma Green Belt, ESEP

Version 1 of the Systems Modeling Language (SysML v1) was adopted by the Object Management Group (OMG) in 2007. Over the years, valuable insights have been gained about the strengths and weaknesses of the language and its ability to support Model-Based Systems Engineering (MBSE). These lessons paved the way to the next generation of Systems Modeling Language known as SysML v2. OMG approved the SysML v2 beta specifications on June 30, 2023, and they are now in the finalization phase, with anticipated adoption by the end of 2024. SysML v2 enhances precision, expressiveness, consistency, usability, interoperability, and extensibility, compared to SysML v1. It offers both textual and graphical representations of the language that enhances system understanding. A standard API and a set of services help navigate, query, and update the model and enable interoperability across tools and models throughout the system development lifecycle. Many vendors are actively involved in the development of SysML v2 tools.

To effectively transition from SysML v1 to SysML v2, organizations will need to define and execute an effective transition strategy and plan. This will help to preserve investments in SysML v1 models while leveraging the enhanced capabilities of SysML v2. To accomplish this, organizations will need to update their modeling practices, methodology, tools, and training to ready the workforce. In addition, organizations should carefully consider which projects will

transition, when to transition, and how to transition to maximize the benefits of SysML v2 and minimize costs and risks.

For this reason, the Director of Digital Engineering, Modeling and Simulation (DEM&S) within the DoD Office of the Undersecretary of Defense for Research and Engineering (OUSD(R&E)), initiated the SysML v1 to SysML v2 Transition Guidance Project. The project objective is to provide DoD organizations, contractors, and the broader community with guidance that will aid transition planning and help accelerate adoption

On January 30, 2023, an initial working session was launched at the International Council of Systems Engineering (INCOSE) International Workshop (IW) to elicit inputs from the community relating to guidance they would like to receive. One of the key recommendations from this session was to develop a set of frequently asked questions (FAQ). As a result, the FAQ was the first product that was developed by this project. The FAQ included responses to 55 questions in the following seven categories.

1. What is SysML v2 and how does it compare to SysML v1?
2. Why should a program and/or organization transition from SysML v1 to SysML v2?
3. When should a program and/or organization transition from SysML v1 to SysML v2?

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4. Who is impacted by the transition from SysML v1 to SysML v2?

5. How does a program/organization or other stakeholder transition from SysML v1 to SysML v2?

6. What is the impact of the transition on a program and/or organization?

7. What are the mechanisms to access and provide SysML v2 guidance information?

The project developed additional guidance products which are summarized in Table 1 and available on the SysML v2 Transition Project Wiki at: https://www.omgwiki.org/MBSE/doku.php?id=mbse:sysml_v2_transition. This Wiki is part of the INCOSE/OMG MBSE Wiki.

At INCOSE IW 2024 in Torrance, CA, a full day SysML v2 Transition Guidance Information session was held on January 28, 2024, followed by a half-day working session on January 30, 2024. These sessions provided a comprehensive introduction of transition guidance to the community and stimulated discussion amongst participants. Daniel Hettema, Director for DEM&S, and the sponsor for the transition project, provided an introduction and motivation for this effort. Additionally, Sandy Friedenthal delivered an overview on SysML v2, and 15 vendors shared their SysML v2 roadmaps in short three-minute segments. In the afternoon, Frank Salvatore, from SAIC, provided an overview of the DoD sponsored SysML v1 to SysML v2 transition guidance project followed by a DoD panel session. Chris Schreiber, from Lockheed Martin Corporation (LMC), presented an industry perspective on how this transition is being initiated at LMC. The day ended with a tool vendor panel session that answered questions related to the transition.

On Tuesday January 30, 2024, there was a half day working session, led by Sandy Friedenthal who provided a deep dive into model conversion and shared a simple starter model designed to help the community get started with SysML v2 modeling and begin their transition journey. The day ended with Gene Shreve from i3 sharing his views and initial lessons learned on SysML v1 to SysML v2 transition and model conversion. All the topics covered at this event along with material presented are available on the INCOSE MBSE Wiki at the SysML v1 to SysML v2 Transition Information Session page. Also, a recording of the full day session on January 28, 2024, is available to INCOSE IW 2024 registered attendees.

The SysML v2 Transition Guidance project will complete its phase one efforts in March 2024, and is currently planning the next phase of the project. This phase is intended to elicit feedback from early adopters and provide further guidance that will enable effective digital engineering implementation in response to DoD, contractors, and the broader community needs.

Vendor participants in IW SysML v2 Vendor Roadmap Session along with SysML v2 Submission Team (SST) Co-Leads Sandy Friedenthal and Ed Seidewitz and Session Lead Frank Salvatore

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Table 1: Transition Guidance Products

Guidance Product	Summary Description
Frequently Asked Questions (FAQ)	Questions and answers that are relevant to organizations and practitioners who are transitioning from SysML v1 to SysML v2.
Transition Planning Guidance	A template for a SysML v1 to SysML v2 Transition Plan. The template is intended to be used by organizations to develop a plan to transition their MBSE practices and skill base from modeling with SysML v1 to modeling with SysML v2. The plan template should be elaborated and tailored to meet the needs of the organization based on specific transition objectives, the organization's current state of MBSE practice, the organization's size and resources, and other factors.
Tool Consideration Checklist	A list of tool considerations was documented based on experience converting SysML v1 models to SysML v2 models. These features can be used by users in their tool evaluation and to guide tool developers.
Environment Installation Guide	This product provides instructions to help with setting up a SysML v2 web-based Jupyter modeling environment. It also provides some references to other instructions along with references to some environments that are already established and available for use.
Model Conversion Guidance	Provides guidance on how to convert a SysML v1 model to a SysML v2 model, including guidance on how to pre-process the model, transform the model, post-process the model, and validate that the model meets its intended use.
Converted Model Examples	The application of the model conversion guidance to previously developed SysML v2 models that were made publicly available including the Skyzer model and the Catapult model. The examples include the original SysML v1 model, the transformed model, and the post-processed model.
Flashlight Starter Model	This is a SysML v2 starter model that can be used to introduce basic SysML v2 concepts, enable users to gain confidence in modeling with SysML v2, and encourage further exploration of the language.

To: newsletter@inco

Subject: Newsletter Article Submission

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Volume 27, Issue 1

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Systems Engineering for Sustainability

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Volume 27, Issue 1

Systems Engineering is an international scholarly journal and a primary source of multidisciplinary information for the systems engineering and management of products and services, and processes of all types.

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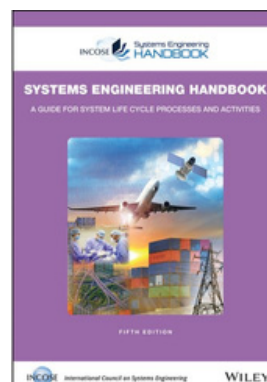
The INCOSE *Systems Engineering Handbook* is a vital reference for systems engineering practitioners and engineers in other disciplines looking to perform or understand the discipline of systems engineering.

Grab your copy at
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INCOSE International Events

By Donna Long, AscD Events, donna.long@incose.net

The International Workshop (IW) was a record-setting success. More than 780 people joined the workshop both in-person and virtually. We featured Safer Complex Systems, Future of Systems Engineering (FuSE), and MBSE alongside our traditional working group sessions and business meetings. The Robot Cabaret was a great opportunity to see Artificial Intelligence (AI) in action. If you were unable to attend the event or missed out on a particular part, check out the INCOSE Content Library which contains recordings and presentations from the event and is available to all members.

In July, the International Symposium (IS) is heading to Dublin, Ireland. The event will be at the Convention Centre of Dublin near the Harp bridge on the river Liffey. Please take note, the event has shifted this year to start with the opening plenary and technical program on Tuesday, 2 July, and ends with tutorials on Saturday, 6 July.

The Technical Program Committee has been working hard to build a great technical program. Notifications have been sent out for all submissions. Drawing from the record number of submissions, we are proud to feature:
- Four invited keynotes
- Four full days of technical content (Six tracks each, with a total of 144 papers and presentations, five panels, and 65 posters)
- Dedicated tracks addressing Digital Engineering, MBSE, sustainability, technical leadership, and more
- Seven tutorials on Saturday
- Three days of virtual presentations to complement the hybrid sessions broadcast from Dublin

IS registration information is available from the IS website at incose.org/symp2024 (registration will open in April). Several links have been posted for hotels near the Convention Centre. I encourage you to make your hotel reservations early as there are several events happening in Dublin around the same time. If your organization is considering becoming a sponsor demonstrating your commitment to INCOSE and systems engineering, sponsorship package details are available on the website.

Mark your calendars for INCOSE events in 2025. We start the year with the International Workshop occurring in Seville, Spain at the beginning of February. The International Symposium will be held in Ottawa, Canada in late July. Let us know if you are planning an event by filling out the Events Form at:
https://app.smartsheet.com/b/form/8755a0e866854485b7ffb8b9ec9aa02c.

We can help with resources and getting the word out!

Upcoming Events

Nordic Systems Engineering Spring Tour 2024
27-29 May 2024
Linköping (Sweden),
Copenhagen (Denmark),
Hamburg (Germany)

INCOSE International Symposium 2024 (IS2024)
2-6 July 2024
Dublin, Ireland

Nordic Systems Engineering Autumn Tour 2024
16-18 September 2024
Oslo (Norway), Stockholm (Sweden),
Helsinki (Finland)

9th Annual Systems Engineering in Healthcare Conference
23-25 April 2024
Minneapolis, MN, USA

INCOSE Human Systems Integration Conference 2024 (HSI 2024)
27-29 August 2024
Jeju, Korea / Hybrid

SESA Systems Engineering Test and Evaluation (SETE) Conference 2024)
22-25 September 2024
Melbourne, Australia

International School on Human-AI Teaming
27-31 May 2024
Biarritz, France

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INCOSE Members Newsletter

Publication of the International Council on Systems Engineering

Who are we?
INCOSE is a 23,000+ 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.
All views expressed in this Newsletter are the writers' own and do not reflect the views of INCOSE.

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