Q1 2023

MEMBERS NEWSLETTER

The International Council on Systems Engineering

In this issue:

- A big announcement from the INCOSE President
- A look back the International Workshop 2023
- Global chapter updates
- Working group and initiative updates
- The launch of Calling All Systems
- New products
- And much more...

A Better World Through a Systems Approach

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Editor's Letter

Honor Lind, Director for Marketing and Communications, honor.lind@incose.net

Hello INCOSE Colleagues, Welcome to Q1 Members Newsletter, where we will be featuring the outcomes from the International Workshop 2023, kicking off the new branding of Future of Systems Engineering (FuSE) inspiring the global community to realize the SE Vision.

INCOSE experienced the power of connection like never before as the largest-ever 2023 International Workshop unfolded in Torrance, California and online across the world.

Meeting INCOSE colleagues in person at my first International Workshop was a transformational experience for me as we shared stories and bonded over INCOSE strategy sessions, panel discussions, and social events.

In this issue, you will learn where to find resources, workshops, conferences, and events to keep you connected to current trends webinars and discussion boards.

Meet INCOSE's newest online event series Calling All Systems, a hosted panel discussion with industry leaders and subject matter experts, on topics important to systems engineering. The first session, The Future of MBSE happens March 21 live online, with recordings available afterward. You can find all the details on page 71.

INCOSE was all over social media leading up to the March 9th International Women's Day Celebration—see the highlights on page 64. In the coming months we will be posting video content from the INCOSE-led online sessions from the event.

If this newsletter has inspired you to get more involved with INCOSE, check out the Volunteer Opportunities Board on page 81 with postings for this year's elected positions including President-Elect, Treasurer, Sector Director for Asia-Oceania, Director of Outreach, and Chief Information Officer.

Finally, don't miss the update on the INCOSE Foundation and the exciting work they are doing in expanding the global reach of Systems Engineering.

I hope you enjoy this edition of Members Newsletter.

Sincerely,
Honor

Honor A. Lind, Editor-in-Chief

A Message from INCOSE President, Marilee Wheaton

Esteemed Colleagues,

I am not sure where to start, it's only March and so much has already happened in 2023, much of which is reflected in this Q1 Members Newsletter.

The International Workshop (IW) held at the end of January had the biggest attendance in its history with a strong focus on FuSE, the Future of Systems Engineering. The FuSE team is driving the work to realize the Systems Engineering Vision 2035, which is a major project by itself, and I would like to congratulate the team on their work to date; some of which is documented in this edition of the members newsletter. I am looking forward to the next in person update which will take place at the International Symposium in July.

I would also like to take this opportunity to sincerely congratulate all the award winners who were acknowledged at the International Workshop and are featured in the newsletter. Later this year we will publish a yearbook featuring all the award winners who are announced at IW and IS 2023.

As suggested by its name, IW has a focus on the technical contributions of our working groups, many of whom ran sessions at IW and a summary of these can be found in the IW overview in this newsletter.

As I am sure many of you are aware of, ensuring INCOSE achieves its goals requires a lot of time and effort and I would like to give my personal thanks to the outgoing INCOSE Leaders; Chris Hoffman, Kyle Lewis, Tom McDermott and Ariela Sofer. I know how hard you have all worked, and have seen the successful outcomes, and want to take this opportunity to publicly thank you for your contributions.

I am looking forward to working with and supporting the new INCOSE Leaders who are joining the Board of Directors. I know you will add a wealth of knowledge and expertise to the board to create a better world through a systems approach.

Also, in this first quarter we have seen the publication of the Systems Engineering Competency Assessment Guide by Wiley, a publication developed by the Competency Working Group and the Natural Systems Primer, published by INCOSE and developed by the Natural Systems Working Group.

You will note that this newsletter is over 80 pages and contains updates of what various working groups and chapters are doing and planning to achieve throughout 2023. As members of INCOSE I encourage you to get involved if something in this newsletter resonates with you. Why not get in touch with the INCOSE Leader/ Group/ Chapter responsible to ask how you can get involved? Your time and talents will be heartily welcomed.

If this first quarter is anything to go by, we are looking at a busy and productive 2023!

Warm regards,
Marilee

INCOSE Welcomes Steve Records as Executive Director

I have big news! The International Council on Systems Engineering (INCOSE) is pleased to announce that Mr. Steve Records will join as Executive Director.

The creation of an Executive Director position is another sign of the growth of INCOSE and its influence in the global systems engineering community and we are proud and delighted to have Steve join us. It has taken a while to find the right person but INCOSE's leadership team was committed to ensuring the right person was chosen for this new position. We are looking forward to beginning a new phase of INCOSE work under his leadership.

Steve told me he considers it a privilege to join INCOSE, mentioning the passion he has already seen in the INCOSE leaders and members. Prior to joining INCOSE, Steve was Executive Director of GEAPS (the Grain Elevator and Processing Society) and CEO of GEAPS Media Group. He previously worked at SCORE, the Gallup Organization, and Nalco Company.

Steve holds a Bachelor of Science in Chemical Engineering from Purdue University, a Master of Business Administration in Finance from the University of Nevada, Las Vegas (UNLV) and he completed the Executive Program for Non-profit Leaders at Stanford University. He is also a Certified Association Executive, a credential that certifies a high level of knowledge about the management of professional associations like INCOSE.

The INCOSE Board of Directors created this new position to ensure the continued growth and development of INCOSE and to support the fulfilment of the INCOSE vision: a better world through a systems approach.

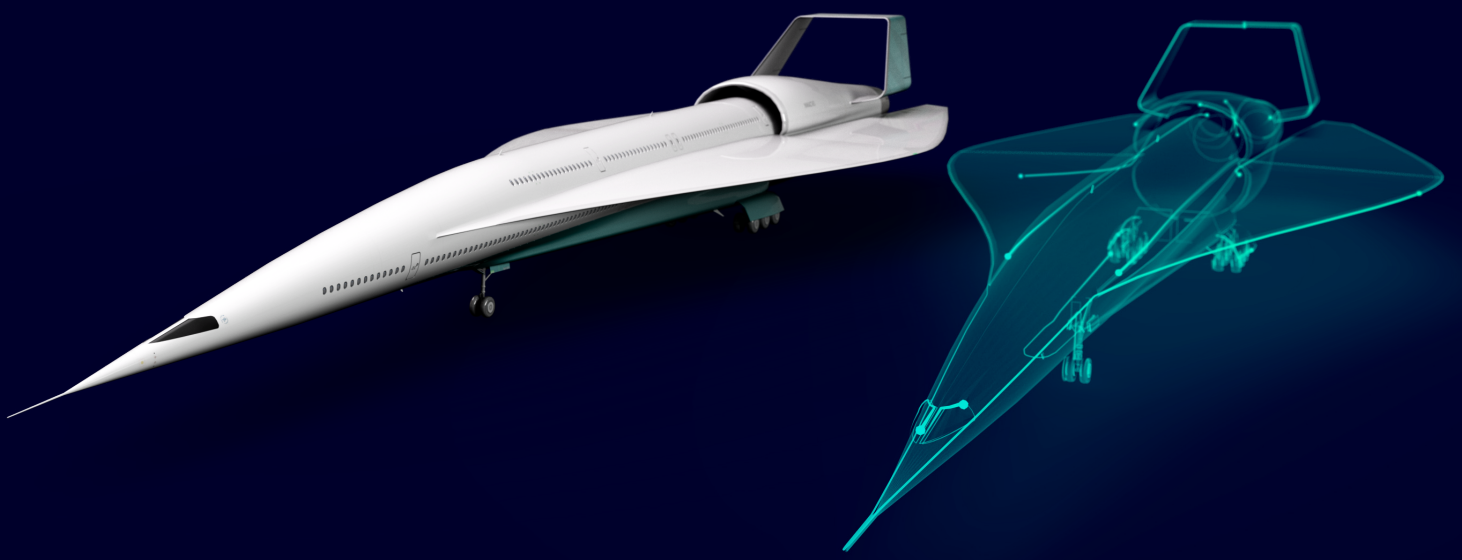
Steve's role as Executive Director includes providing visionary thought leadership in association management, acting as a spokesperson and key representative for INCOSE, and advising and supporting the Board of Directors in governing the organization. He will also manage, oversee, and support relevant outreach initiatives and events including INCOSE's annual International Symposium.

Please join me in welcoming Steve as he joins on April 3. You can reach him at steve.records@incose.net

Sincerely,

Marilee Wheaton

INCOSE President



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Read the ebook

SIEMENS

Making a Difference in the Future of Systems Engineering at IW2023

The annual INCOSE International Workshop focused on FuSE, the Future of Systems Engineering, to realize the Systems Engineering Vision 2035.

The FuSE initiative kicked off at IW2018 under the sponsorship of president Garry Roedler and since that time the following working groups and ad hoc groups have proactively proposed and initiated more than a dozen projects under the aegis of FuSE: Agile Systems and Systems Engineering, Artificial Intelligence Systems, Complex Systems, Human Systems Integration, Smart Cities Initiative, Systems Science, Systems Security Engineering, Systems Engineering Principles Action Team, and the Fellows update of Systems Engineering Heuristics. We have also had an ongoing outreach with the broader systems community, especially with the IEEE Systems, Man, and Cybernetics Society (SMCS). Individuals and working groups wanting to contribute to the realization of the Systems Engineering Vision are encouraged to contact us at FuSE@incose.net.

FuSe Mission

- Engage and inspire the systems community for sustaining the future of systems engineering in realizing the SE Vision 2035.
- FuSE refines and evolves the SE Vision 2035 across competencies, research, tools & environment, practices, and applications.
- FuSE identifies critical gaps towards the vision realizations and initiates & supports relevant actions.
- FuSE fosters involvement and collaboration within and outside of INCOSE.
- FuSE educates, shares success, and expands.

We launched the next phase of FuSE at IW2023 to scale up both within INCOSE and the broader systems community, framing the structural relationships, workflows, cadence, and value models to realize the SE Vision 2035. Dr. Olivier de Weck, Apollo Program Professor and Professor of Astronautics and Engineering Systems at MIT led off with the FuSE hybrid keynote on the foundations of systems engineering both from the scientific literature and industrial practice, with emphasis on functional, structural, and organizational complexity metrics.

The FuSE projects have been clustered into four streams: **Vision & Roadmaps** led by Paul Schreinemakers, **Foundations** led by Oli de Weck, **Methodologies** led by Chris Hoffman, and **Application Extensions** led by Tom Strandberg. We are in the process of recruiting co-leads for each of the streams from members of the systems community outside of INCOSE.

The SE Vision and Roadmaps stream continuously refines, evolves, and complements the SE Vision 2035. Furthermore, we create an integrated set of roadmaps.

The SE Foundations stream has its basis in both theory and industrial practice. First goal is to assess the adequacy of the foundations and identify gaps to determine future directions.

The SE Methodologies stream guides the advancement of practices, methods, and tools for engineering systems to be fit for purpose.

The SE Application Extensions stream integrates social sciences and soft systems into systems engineering practice to address grand challenges.

FuSE has established a Program Management Office (PMO) supported by 3DSE (Martina Feichtner and Stephan Finkel), with executive oversight by President-elect Ralf Hartmann, Director for Strategic Integration David Long, Technical Director Olivier Dessoude, and Deputy Technical Director Erika Palmer. There is a strongly coupled interface with Director of Marketing and Communications Honor Lind and her MARCOM team.

Each of the FuSE streams conducted in-person workshops throughout the IW2023 and Bill Miller delivered the hybrid wrap-up session on the final day of the workshop.

- We made the INCOSE community aware of FuSE and engaged with individuals and working groups.
- We highlighted the relation to the Systems Engineeirng Vision 2035.
- We had more than 150 engaged participants per day in our working sessions.
- We validated the value to pursue the FuSE initiative and set the basis to continue the work inside and outside our community.
- We generated additional input, ideas, thoughts to consider in ongoing FuSE activities.

FuSE materials from IS2023 are posted in the FuSE community on Yammer.

FuSE workshops at IW2023 were in-person only. FuSE will conduct a series of recorded webinars to brief IW2023 outcomes to our wider community.

Key Insights Vision & Roadmaps Stream

- The goals stated in the SE Vision 2035 needs to be made measurable.
- It is crucial to involve a young and diverse community (within and outside) of INCOSE to realize the SE Vision 2035.
- Specific measures to do the above were conceptualized at IW.

Key Insights Foundations Stream

- Generated data via the complexity experiment, need to post process data and verify or falsify our initial assumptions.
- Experiment was fun and mimics SE reality, but needs refinement to be even more realistic.
- Group breakout on technical complexity did confirm our basic direction, but also revealed additional drivers we need to considered.

- Involvement of SSWG highlighted what is already existing and benefits of joining forces.
- Group breakout on org complexity illustrated need for more discussion and alignment on how to model org complexity.

Key Insights Methodologies Stream

- Disrupters were multi-dimensional and included:
  - Lack of training.
  - Past failures leading to low trust of new items.
  - Limited resources.
  - Impeded development of practical SE methods.
  - Lack of support to change (stagnated culture).
- Solution proposals were generated and initially screened. Work remains to form and select the highest potential solutions to focus upon.

Key Insights Systems Engineering Application Extensions

- Systems Engineering Application Extensions stream purpose and topics have been validated. Measures of effectiveness (MOEs), risks and activities have been proposed by the participants.
- Smart Cities – good foundation exists for reaching out to internal & external groups. Next step is the validation by application together with mayors or alike.
- Innovation – an innovation framework based on systems thinking identified to be a useful means to engage with new target groups. Good potential for collaboration between working groups.
- Asset Management – Value and interest to cooperate with the Institute of Asset Management to align the forces. Identify the respective working groups within INCOSE.
- Grand Challenges – Quite some Value Propositions identified that INCOSE could provide – Proposed next step set up a cross-WG initiative and to seek collaboration with complementary organizations with a joint message to target groups.

2023 Key Milestones Synchronized to INCOSE Events

Visit the FuSE Web page to see our detailed calendar of events

Key Success Factors

- Inclusive: From limited participation to inclusive initiative
- Attractive: Engage members and non-members
- Implementation: The degree to which the road map is realized
- Fresh: Relevant and updated road map and context
- Close to application: Involvement of companies and domains
- Global promotion: Attractive global digital marketing
- Passion: To get the working groups proud to be part of it

Again, we encourage individuals and working groups not yet engaged with FuSE to contact us at FuSE@incose.net. We need you to have a strong and diverse workforce to shape the future of systems engineering.

By Bill Miller - FuSE Program Lead

FuSE Webpage

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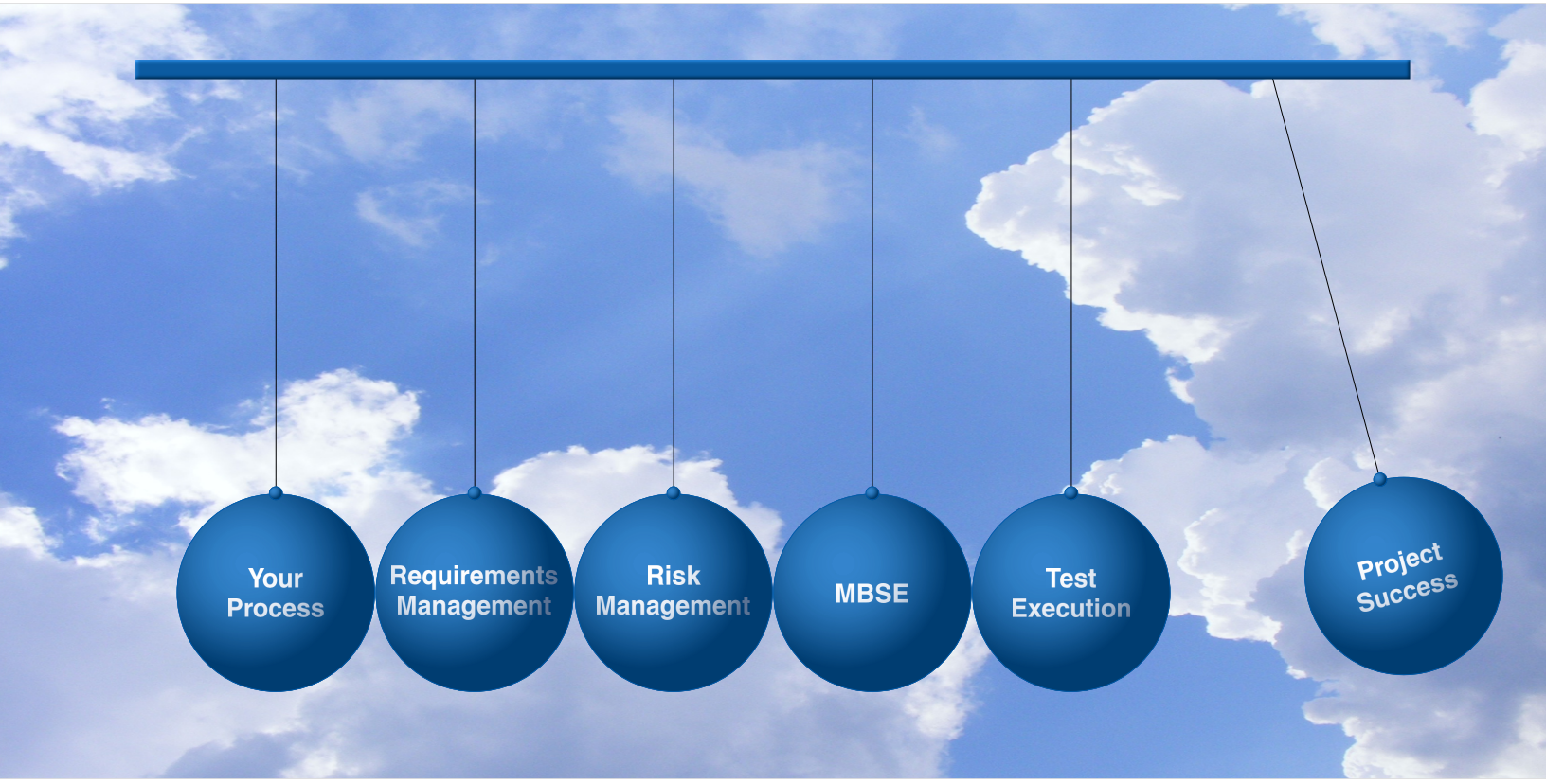

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To our customers of many years, 3SL would like to say a warm **"Thank you!"**

INCOSE would like to apologise to 3SL for the incorrect font used in their advert in the December 2022 Members Newsletter.

Decision Analysis Working Group at IW2023

The INCOSE Decision Analysis Working Group (DAWG) sees decision management as a key challenge to realizing the INCOSE Vision 2035.

As system complexity increases, an analytical, easily deployable method for consistent decision making must exist. Therefore, the DAWG is developing a Decision Analysis Data Model (DADM) as a reusable asset to aid practitioners in making consistent data-informed decisions. This data model leverages the latest Digital Engineering and MBSE methodologies to realize the path to Vision 2035.

The DAWG held two sessions during IW 2023 to further refine the DADM development approach. Topics included a review of the current data model, decision analysis tool demos, and collaborative brainstorming sessions to determine the next steps of the DADM. The DAWG is now looking forward to IS 2023 and will be hosting a panel discussion on "The Future of Decision Analysis". We look forward to shaping that future with you!

By Jared Smith

DAWG WG Wegpage

SELAW Working Group at IW2023

The Systems Engineering and Lawmaking (SELAW) WG held their first International INCOSE meeting at the 2023 IW in Torrence

The WG was pleasantly surprised by the enthusiastic turnout of systems engineers interested in its mission: the application of systems engineering principles and practices to both improve and standardize the art of lawmaking.

Formed in May 2022, the SELAW WG is dedicated to the improvement of the lawmaking process through the application of systems engineering principles and processes. SE has shown to be effective in improving quality and consistency in many sciences and engineering fields, such as aviation, energy, and manufacturing -- why then, do we not apply the same discipline to lawmaking? SELAW has organized subgroups to study this new field of SE and lawmaking, to includes topics such as critical reviews of existing laws and lawmaking methods, and exploration of new and improved methods for creating and validating laws.

Contact us (SELAW) if interested - volunteers are needed for topics such as modeling of the sanctions, costs, and risks of laws, and critical evaluations of existing legislative statutes. See our INCOSE website (which includes contact info).

By Greg Bulla - SELAW Working Group Chair

SELAW WG Webpage

MBSE Patterns Working Group Highlights of IW2023

The MBSE Patterns Working Group met during IW2023 on Sunday, Jan 29, with 37 participants, of whom 22 were on site.

This busy working group reviewed fourteen recent, current, and startup projects, three of which were also highlighted during the MBSE Workshop Round Robin: Patterns WG IW2023 Projects Summary.

AIAA Publishes Digital Twin Reference Model, Based on INCOSE Innovation Ecosystem Pattern

The American Institute for Aeronautics and Astronautics has released its AIAA Digital Twin Reference Model and Case Studies publication. The Digital Twin reference model adopted for this aerospace industry-reviewed project is the INCOSE Innovation Ecosystem Pattern, which the Patterns Working Group has evolved from the INCOSE Agile SE Life Cycle Model Discovery project, performed jointly with the Agile SE Working Group. AIAA is also in the publication process for release of its parallel Digital Thread project, currently summarized in the AIAA Digital Thread Reference Model and Recommendations Report. These are both key aerospace industry references in which the INCOSE Patterns Working Group has played key collaborative roles for both the reference models and case studies.

Semantic Technologies for Systems Engineering (ST4SE) Project Releases Project Report

The MBSE Patterns Working Group reviewed the ST4SE Project Report published as part of the Semantic Technologies for Systems Engineering Project. This included illustrative demonstration of both automated generation of configured SysML MBSE Model from a generic SysML MBSE Pattern, and also automated conformance checking of a SysML MBSE Model for conformance to a generic SysML MBSE Pattern. Semantic Technologies include W3C standards-based languages and industry semantic automated reasoners.

Pattern-Based Support for INCOSE FuSE Foundations and Applications Workstreams

During IW2023, the Patterns WG provided support for Future of Systems Engineering (FuSE) sessions in both the Foundations and Applications workstreams. The working group continues to support the FuSE Foundations workstream, led by Prof. Oli de Weck, including applications of its contributions of Vision 2035 Theoretical Foundations. Contributions to the FuSE Applications workstream, led by Tom Strandberg, are being provided for the Innovation as Application effort, based on the Innovation Ecosystem Pattern from the Patterns Working Group.

By Bill Schindel - MBSE Patterns WG Chair & Troy Peterson - MBSE Patterns WG Co-Chair

MBSE Patterns WG Webpage

Working Strategy at IW 2023

As his last official act, outgoing Director for Strategic Integration Tom McDermott organized the strategy workshop at IW 2023. More than sixty-five international, sector, and chapter leaders gathered in Torrance, California with another twenty-five contributing virtually as INCOSE explored four strategic questions across two parallel sessions in the morning and two additional parallel sessions in the afternoon.

Each half-day session built upon learnings on effective hybrid workshops from IW 2022. Session leads shared background information, framed the critical questions, outlined the session approach, then leveraged in-person and virtual breakout groups enabling everyone to engage and contribute effectively. Quick synopses and discussion from the breakout teams shared insights across the hybrid group and seeded the path forward.

Leading off the morning Olivier Dessoude, INCOSE's Technical Director, conducted a session exploring "INCOSE Operations & the Sustainability Challenge" asking **how do we as INCOSE address our global footprint**. Multiple breakout teams addressed the same set of questions noting that sensitivity to the sustainability issue and exposure to criticism and air-shaming for travel is not the same for all, likely due to cultural and individual differences. While INCOSE has made progress on the sustainability front (e.g., reduction in travel, reduction in paper publications at workshops and symposia, enhanced virtual infrastructure in response to COVID), it was suggested that sustainability progress was largely a byproduct of other actions. In the words of one group, "*it's the difference between being reactive and incremental as opposed to holistic, strategic, and systemic.*" The general consensus was that INCOSE can better address its sustainability footprint and consider levers such as decisions to spend money for travel, selection of event locations, the size and frequency of events, and virtual vs. in-person events. Possible paths forward include creating a Sustainability Working Group, chartering a small team to make sustainability proposals, monitoring key indicators, and establishing a sustainability policy.

In parallel with the sustainability session, Heidi Davidz, INCOSE's Deputy Services Director, facilitated a dialog on "Services Value Stream Optimization" seeking to understand **how INCOSE can more rapidly and efficiently bring value to its members**. With the accelerating pace of change across the discipline, INCOSE must tighten the knowledge cycle to provide timely services which help members stay on the cutting-edge as technical leaders. In order to provide value "at the speed of relevance" to our members and stakeholders, we must examine and optimize the INCOSE Services value stream from "new idea" through "value delivery." Participants were split into three teams (Certification, Events, Education and Training) and asked to map their value stream with high-level process steps and general times.

They then identified opportunities to get contemporary information to members faster with thirty-five candidate ideas emerging. Examples included adding learning development plans for timely topics (such as artificial intelligence / machine learning); transforming the current, private horizon scanning group into a formal INCOSE technology-sensing role; utilizing the Spotlight Series to highlight new technology; conducting more mini-events; and conducting focus groups with companies and individuals in fast-paced industries external to INCOSE. The INCOSE Services team will assess the candidate opportunities identified and share the results of their evaluation.

In the afternoon, Donna Long, INCOSE's Associate Director for Events, used a persona-based approach to explore "An Effective Events Portfolio in the Hybrid World" asking **how will INCOSE manage its events portfolio into the future**. Four teams formed around four identified personas – a systems engineering student, an early career systems engineer, a mid-career systems engineer, and a senior organizational leader. The teams brought additional depth to their persona (name, location, and other aspects they wished) before addressing three questions designed to shape our future events portfolio:

1. Why does INCOSE care about the persona, why do they care about INCOSE, and why do they care about INCOSE events?
2. How does INCOSE delight the persona through in-person, hybrid, virtual events?
3. How does INCOSE delight the persona through international, regional, and local events?

In addition to answering these questions, participants identified two additional personas – retirees and tenure-track faculty – that they felt INCOSE did not appropriately serve today through events or other offerings. The Events Committee will synthesize the insights gained looking at how we can better shape our existing in-person/virtual/hybrid approach at the international/regional/local levels. No one event will serve every need, but an effective events portfolio should address the various personas and needs. In addition, INCOSE will leverage this persona-based approach and investigate additional personas as part of dialogs spanning strategy, membership, and academic matters.

Tom McDermott led a second afternoon session on "The Digital Workforce Ecosystem" exploring **do we have the workforce as we move to Digital Engineering and Model-Based Systems Engineering (MBSE)**. As systems engineering transforms to be digital and model-based, an evolution of the workforce is underway. Talent may be the most critical barrier. Participants split into five teams with each team first discussing emerging challenges in each of the three categories: Education/Training, Enterprise, and Sector/Ecosystem. Each team reported to the full group what they saw as the top two challenges in each of the three categories and then discussed what INCOSE Services might provide to address these challenges. Interesting ideas that emerged included:

- developing a systems engineering technician reference curriculum similar to the Graduate Reference Curriculum for Systems Engineering (GRCSE) for graduate curriculum;
- comparing and contrasting the Systems Engineering Competency Framework (SECAF) with the United States Department of Defense Digital Engineering Competency Framework (DECF) in order to infuse Digital Engineering competencies into SECAF;
- creating an experimental environment, guidebook, guiding tools and processes with moderation and help;
- initiating a joint working group with professional societies for procurement organizations to further develop model-based acquisition;
- shepherding a long-term capstone project.

As with the ideas that emerged from the value stream optimization session, INCOSE Services will evaluate these ideas for potential implementation and share the path forward.

Balancing the benefits of in-person, hybrid, and virtual sessions, INCOSE complements the hybrid IW strategy session with a virtual strategy session in Q3. Currently scheduled for 1-3 August, our Q3 sessions will be arranged via topic and time zone to ease engagement around the world. Thank you to INCOSE leaders from all levels who generously contribute their time and ideas to make these sessions a success.

By David Long, ESEP - Director for Strategic Integration, david.long@incose.net

SysML v2 Events at the INCOSE IW 2023

The final SysML v2 submission to the Object Management Group is planned for February 20, 2023, and if approved will become a beta specification leading to a final adopted SysML v2 specification in 2024.

Sanford Friedenthal, Ed Seidewitz, and Manas Bajaj provided a 3.5-hour overview and demonstration of the SysML v2 language and Systems Modeling API and Services on Monday, January 30. The SysML v2 Overview presentation can be found here.

In addition, Frank Salvatore and Emily Bak conducted a two-hour SysML v2 Transition Workshop following to obtain inputs from the systems engineering community on the kinds of guidance that would aid in the transition from SysML v1 to SysML v2. This workshop was conducted on behalf of the DoD Digital Engineering, Modeling and Simulation Office, which is planning to develop transition guidance by the time the final SysML v2 specification is adopted by the Object Management Group (OMG). Their introductory presentation can be found here.

By Sanford Friedenthal & Frank Salvatore

Working Group Awards

Achieving the Systems Engineering Vision
Presented to
Digital Engineering Information Exchange Working Group


Sean McGervey


Frank Salvatore


Tamara Hambrick


Terri Chan


Celia Tseng

Collaboration
Presented to
Smart Cities Initiative


Jennifer Russell


Marcel van de Ven


Rael Kopace

Outreach
Presented to
Requirements Working Group


Tami Katz


Lou Wheatcraft


Michael Ryan


Raymond Wolfgang

Sustained Performance
Presented to
Israeli Human Systems Integration (HSI) Working Group


Ami Harel

2022 Product of the Year Awards

Product of the Year
Presented to
Requirements Working Group


Kathy Baksa

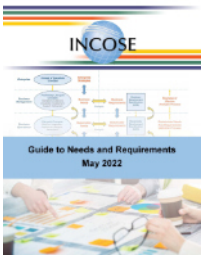

Tami Katz

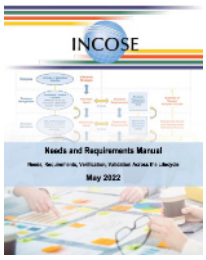

Lou Wheatcraft

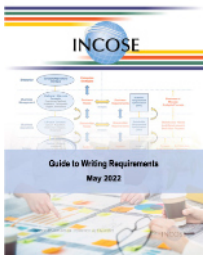

Michael Ryan

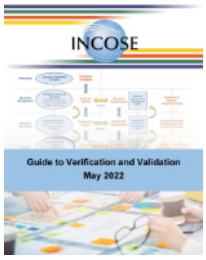

Raymond Wolfgang


Rick Zinni









Product of the Year
Presented to
Systems Engineering Vision 2035 Team


Sandford Friedenthal


Christopher Daley


Sky Matthews


David Nichols


Paul Nielsen


Christopher Oster

Taylor Riethle


Garry Roedler


Paul Schreinemakers


Emma Sparks


Heinz Stoewer

Welcome to the New INCOSE Leaders

Welcome to all new INCOSE Leaders.

Olivier Dessoude

Technical Director

Sven-Olaf Schulze

Director for EMEA Sector

Alejandro Salado

Director for Academic Matters

David Long

Director for Strategic Integration

Kirk Michealson

Director for Outreach

Don York

INCOSE Secretary

Bernardo Delicado

Academic Equivalency Coordinator

Robert F. Bordley

Assistant Director, Special Projects and Liaisons

Thank you to all the outgoing Leaders.

Tom McDermott

Director, Strategic Integration 2020 - 2022

Kyle Lewis

INCOSE Secretary 2021 & 2022

Christopher Hoffman

Technical Director 2021 & 2022

Ariela Sofer

Director, Academic Matters 2022

Volunteer Opportunities

HELP SET THE STANDARDS IN THE FIELD OF SYSTEMS ENGINEERING FOR THE GLOBAL COMMUNITY

JOIN THE BOARD OF INCOSE

There are several volunteer board positions coming up for election and now is the time to submit your application. The positions that are up for election are:

- **President-Elect**
- **Chief Information Officer (CIO)**
- **Director for Outreach**
- **Sector Director, Asia-Oceania Sector**
- **Treasurer**

Application Deadline: 6 August 2023

To find out more about the positions and to submit your application visit www.incose.org/volunteer or email voadmin@incose.net

Corporate Advisory Board (CAB)

What is the INCOSE Advisory Board?

- The advisory board, consisting of corporate and academic members, shapes and influences the direction of INCOSE's work in advancing the profession and practice of systems engineering.
- The CAB provides strategic guidance to technical leadership, leading to the development of systems engineering products and standards to meet their needs.
- CAB representatives bring the value of INCOSE to their organizations and promote the profession and practice of systems engineering.

Why should your company join the CAB?

Employees can gain access to the state-of-the-art products.

CAB membership allows your company to guide the direction of the discipline.

Gain better access to talent – find and hire competent, certified Systems Engineers through your INCOSE connection.

Align with peers and fellow industry leaders, grow your global footprint, and learn about how other industry leaders are applying Systems Engineering to solve problems.

New CAB Members since July 2022:

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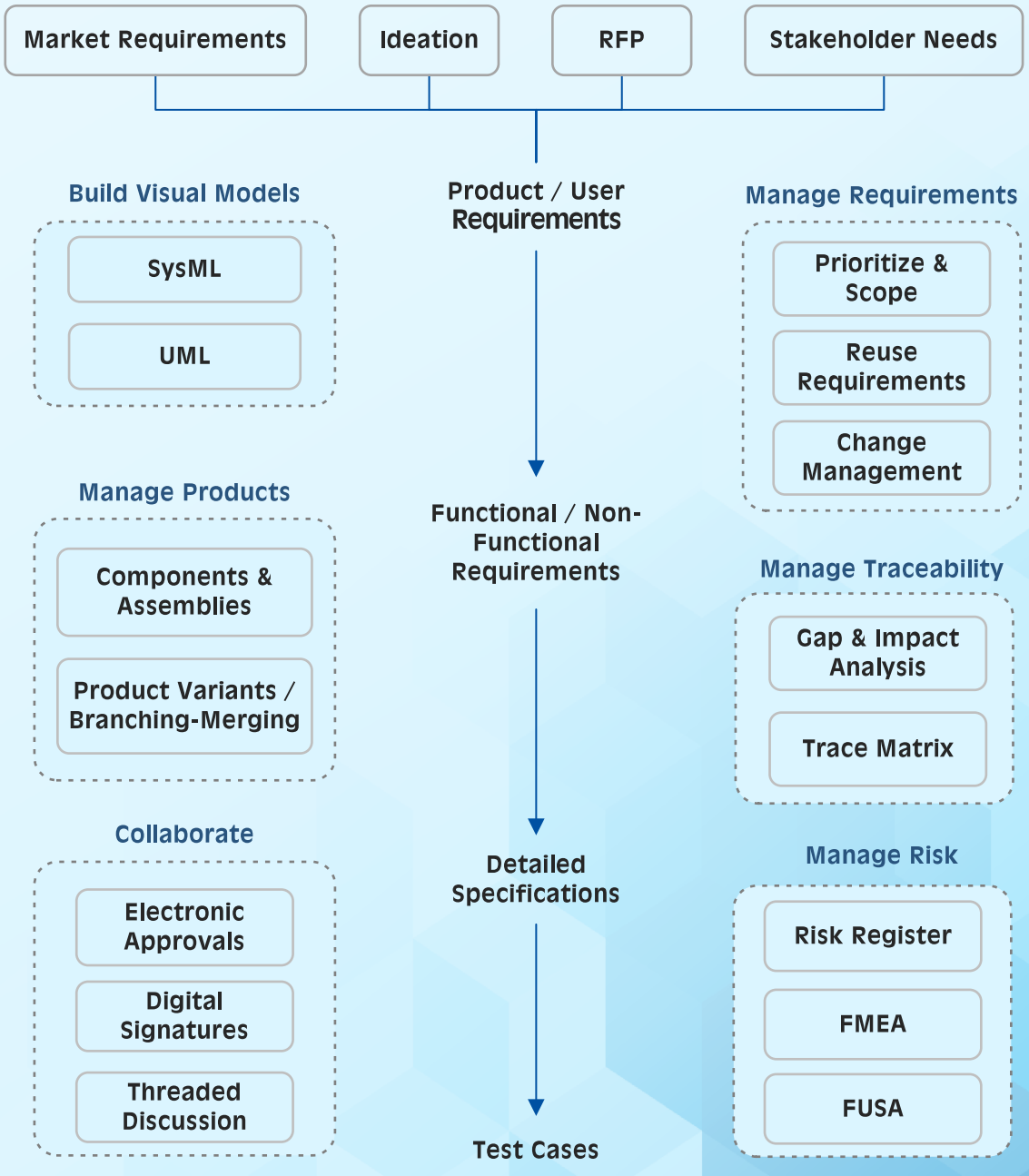
CAB Wegpage

Daunting...



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An Update from Certification

INCOSE's Certification Program had a big presence at INCOSE's International Workshop. Candidates had two opportunities to take the knowledge exam, plus discussions about how to apply for CSEP, how to apply for ESEP, how to apply for Academic Equivalency, and how to renew ASEP and CSEP certification.

Current SEPs participated in a luncheon where they discussed which animal would make the best systems engineer and they acquired Tshirts showing they are "deSEPtively strong." Similar activities are planned for INCOSE's International Symposium.

Academic Equivalency tends to be a major area of focus for INCOSE's Certification Program in 2023. In 2022, 675 students met the knowledge requirement through their university coursework. With additional universities being approved soon, that number will continue to grow each year. Information about Academic Equivalency is found through Webinars 156 and 162.

The Certification Advisory Group (CAG) is also reviewing the process and forms for ESEP applicants. They are working to attract more candidates for ESEP from all domains and countries. This is part of an overall review the CAG is doing of all Certification Program requirements to ensure they are solution-neutral.

A major, near-term activity for INCOSE's Certification Program is the update of the INCOSE knowledge exam to align with SEH5E. Candidates will participate in beta testing during Q2 of 2023. The knowledge exam will be based on the overlapping content of the INCOSE handbook's fourth and fifth editions starting shortly after the release of the fifth edition handbook. More information about that exam transition is described in INCOSE Webinar 160.

By Courtney Wright, CSEP - INCOSE Certification Program Manager, Courtney.Wright@incose.net

Certification Webpage

Want Innovation to Thrive? Create Open Welcoming Environments.

A team of systems engineering experts and leaders were preparing to present examples of their research and practical guidance at an open technical session of the IW2023, excited to be a part of INCOSE and the society's vision of a systems approach for a better world. However, several minutes prior to the start of the session, it was announced that the session was sponsored by the Empowering Women Leaders in Systems Engineering (EWLSE) initiative, a group that advocates for women.

Several gentlemen in the room, some of whom had been patiently waiting in anticipation for the session to start, gathered their things and hurriedly left. What happened? Let's look to strategies for developing four types of leadership for today's world, and to the areas of emerging trends in systems engineering leadership addressed by the 26 women authors of Springer's Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders book, for some guidance and related discussion points.

Trend #1: Growing Demand for Essential skills

Resilient leadership (Figure 1) is key for effectively leading others, especially through adversity and change, and starts by first taking care of ourselves followed by understanding our life purpose, practicing mindful reflection, and pursuing positive relationships and personal mastery. Next, we can focus on developing essential skills, also known as soft skills. These human skills are increasingly in demand as our relationships become more interdependent and complex on a global level. For women especially, promoting oneself into leadership from any position or role is an important essential skill. We show how to promote oneself into leadership in Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders. We also show that, for systems engineers specifically, a combination of influence and persuasion and the professional systems engineering competencies as outlined by the INCOSE Systems Engineering Competency Framework are key to enabling systems engineering throughout the organization and preserving the strategic thread. And we demonstrate that knowledge sharing and mentoring are crucial for growth, opportunity, and overall career progression. Essential skills also include 1) empathy and perspective taking, and 2) an understanding of the sense of belonging. Both are essential to understanding challenges for women and men when it comes to team participation and engagement. Both men and women can feel excluded from participating in teams and sessions where their presence may not be treated as favorable, or that appear to be meant primarily for men, or women. In these cases, additional steps may need to be taken so that all genders feel welcome.

Figure 1. Strategies for Developing Resilient Leadership (credit: Alice F. Squires)

Several gentlemen in the room, some of whom had been patiently waiting in anticipation for the session to start, gathered their things and hurriedly left. What happened? Let's look to strategies for developing four types of leadership for today's world, and to the areas of emerging trends in systems engineering leadership addressed by the 26 women authors of Springer's Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders book, for some guidance and related discussion points.

Trend #2: Emerging Social Trends with a Focus on Diversity, Equity, and Inclusion

Inclusive leadership (Figure 2) supports contributions from each member of the team and allows the team to learn and grow together. Inclusive leadership requires a humble commitment to learn about others while also seeking to identify and understand our own biases. Strategies to develop inclusive leadership skills also include an insatiable curiosity about the world, living in and learning about other cultures, and establishing collaborative relationships. In Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders, we show that to achieve optimal system solutions, it is essential to integrate diversity across the system design cycle both by building a diverse team with diverse world views but also by engaging with diverse stakeholders and building the system for a diverse user set. In some cases, this can save lives (e.g. seat belt design, heart attack treatment, protective vests). We also analyze the engineering pipeline using the design – measure – analyze – improve – control (DMAIC) methodology to develop a set of recommendations that include increasing transparency of what's going on in the pipeline and establishing a standard for behaviors in the pipeline. When it comes to gender equity, one obstacle includes instances where men are successfully able to take credit for womens' work or otherwise devalue womens' contributions and they are able to do so due to their gender. Another obstacle to gender equity is a gender bias when it comes to technical expertise, whereby men are considered naturally technical and women are considered naturally social. The bottom line is all genders want to be recognized by their peers and leadership for their technical expertise and innovation, and they appreciate full recognition for a job well done.

Figure 2. Strategies for Developing Inclusive Leadership (credit: Alice F. Squires)

Trend #3: Broadening Leadership Facets: Systems thinking, Utilitarianism, Ethics

Systems thinking, utilitarianism, and ethics are key to effective systems leadership (Figure 3). Systems leadership requires developing non-linear (abstract) thinking, systems thinking (critical thinking guided by systems theory), and paradoxical mindset (holding two conflicting ideas in harmony) approaches along with a diverse worldview and a human focus. A systems leadership approach (Figure 4) can be applied to any system. In Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders, we provide systems thinking oriented checklists for the needs of higher education stakeholders including students, faculty and staff, institutions, and employers, for addressing tough decisions such as the ones made during the pandemic and for re-imaging higher education. We also apply the 3R model – do the right thing, at the right time, in the right way - to demonstrate how ethical systems engineering leadership increases the likelihood of realizing successful systems, and confirming ethics as a valuable skill for leaders. And we show how a focus on utilitarianism can help systems

engineering leaders address complexity and in some ways simplify decision-making. As shown in Figure 3, a human focus is one of the five effective strategies for the systems leader; and experience has shown that teams comprised of both women and men, where psychological safety and communication equity are present, produce higher quality products and services.

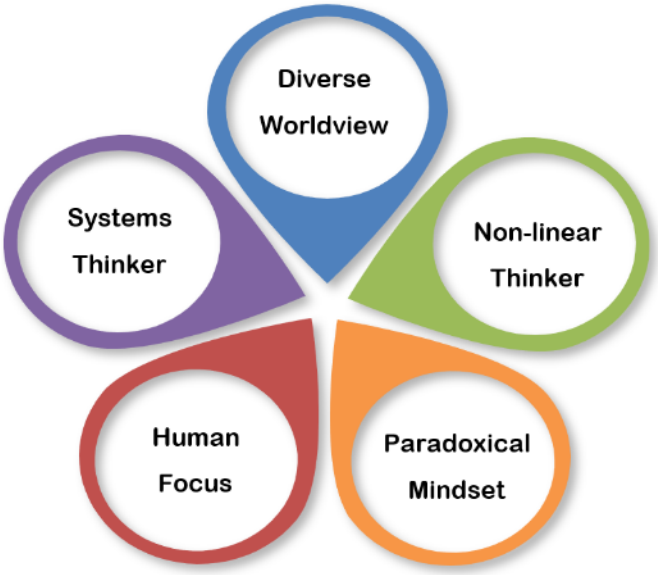


Figure 3. Strategies for Developing Systems Leadership (credit: Alice F. Squires)

Figure 4. Roadmap for Systems Leaders (credit: Alice F. Squires)

Trend #4: Emerging Technological Trends: Systems Resilience, Digital Engineering, and More

Sustainability leadership (Figure 5) has gained focus in this increasingly complex and transforming world. A sustainable systems mindset is key for developing sustainability leadership along with having a global purpose and worldview, engaging in sustainable practices, and making decisions as if we will live forever – for preserving the future of people and the planet. Technological trends include advances in the

digital transformation and cybersecurity, Industry 4.0 with its ubiquitous 3-D printers, artificial intelligence and machine learning, remote technology and hyper-automation, and more. Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders covers both building systems resilience into the design of the system using social-ecological systems as the example, and developing and sustaining a value-driven enterprise strategy based on digital engineering. According to the SE Vision 2035, emerging global trends include:

- Environmental sustainability as a global priority.
- Increasing global interdependence in an increasingly interconnected world.
- Digital transformation which impacts how we work, and what we produce

Figure 5. Strategies for Developing Sustainability Leadership (credit: Alice F. Squires)

- Global change that is driven by:
  - Industry 4.0 (cyber-physical systems) and
  - Society 5.0 (socio-cyber-physical systems).
- System complexity is increasing on global level
- Smart elements are increasing in systems; and smart systems are increasing in systems of systems (SOS).

Women are an essential part of emerging technologies and innovation and without women we lose more than 50% of our team creativity, ideas, and progress due to not only losing the technical expertise and creativity women bring to the table but also due to the idea that cognitive diversity underlies a team's ability to achieve high performance in any area.

Change requires the collaboration of women and men. To change the current system, both men and women have to feel like they are part of the conversation. And the conversation has to support both communication equity and psychological safety – for any gender. At the IW2023 session referred to at the start of this article, more people entered the room after the initial announcement, both men and women. Towards the end of the session another announcement was made that participants were comprised of about half and half, women and men. One goal of the session was to have broad representation in the audience and gender representation was important for the message. Successful collaboration starts with an open welcoming environment. This allows diverse teams to thrive and together advance technology and achieve innovations in support of a better world.

By Dr. Alice F. Squires - EWLSE Founder, alice.squires@incose.net

Not For Women Only

I haven't written an article about football since Pat Hale and I co-authored one following the deflategate scandal at the AFC Championship Game on January 18, 2015. In that article we made the case that better specification of requirements and testing procedures could have prevented the situation.

A similar comment re: specs and reviews could be made about this year's Superbowl, which was played on February 12, 2023. With 1:54 left in the tied game and the Chiefs only 15 yards out from the goal line, Eagles cornerback James Bradberry was called for holding. This resulted in an automatic first down, which allowed the Chiefs to run out the clock then kick a field goal to win the game. Without this, the Chiefs would have had to turn over the ball, giving the Eagles a chance to tie even had the Chiefs scored a touchdown on that outing. Review of the call was not possible at that point in the game.

Bradberry said later that he had tugged on his opponent's shirt, but this was the first defensive penalty called in the entire game. It's hard to believe that in the previous 58 minutes of the hard-fought game, no one's shirt got tugged a little bit. Yet, there were no calls made up until this one. This might be a case where the "requirements" for what constitutes a hold need better specification. How hard a tug counts? How long must the tug be held? I could go on about this, but it's not what I want to talk about today. Instead, I want to talk about the losing quarterback, Jalen Hurts.

Hurts is the black quarterback for the Philadelphia Eagles, who lost the Superbowl after the bad call by the referee. He was recruited to the University of Alabama after his senior year in high school but didn't start playing until his sophomore year, playing as a true freshman. He was benched at the end of his sophomore year due to subpar performance during a championship game and was a backup in his junior year, playing in only one game. He transferred to the University of Oklahoma to complete his final year of eligibility. He had stellar careers at both universities (with the one exception already noted), as both a passer and a rusher.

Hurts was chosen by the Eagles as their second-round draft pick in 2020 and joined the team as their third-string quarterback. By Week 13 of that year, he was their starter.

In the Superbowl game, Hurts became the first NFL quarterback to throw for 300 yards, run for 70 yards, complete 70 percent of his passes and rush for three touchdowns EVER and he did this while not being intercepted once. Pretty impressive but not as impressive as what he did off the field after the game. As reported by Jason Gay of the Wall Street Journal, Hurts apologized to his teammates in the locker room and explained that he doesn't play football to be loved or to seek anyone's approval. He is quoted as saying "*I do it for the guys in the locker room. I do it for all the time that we've invested into this.*"

Further, Gay reports that in the postgame Hurts commented that "*You either win or you learn, that's how I feel.*" He did not play the blame game either with his defensive line – who made most of the mistakes that cost the Eagles the game – or the referee who had made the questionable call. Now that's leadership! Whether you're a football player or a systems engineer, that's something we all can learn from.

By Dr. Heidi Hahn - INCOSE Certification Advisory Group and the PMI/INCOSE/MIT Alliance Team

Membership Update

The INCOSE Membership function, which reports to the INCOSE Secretary, includes three main functions:

- New Member Recruitment
- Member Engagement and Retention
- Lapsed Member Recapture

INCOSE WELCOME CENTER
Engaging INCOSE members

In 2022, the New Member Engagement Team launched major initiatives to support member engagement and lapsed member recapture. The New Member Welcome Center program, which consists of the Welcome Center (www.incose.org/welcome) and the monthly New Member Welcome Center Café programs. About 100 people per month attend the Café sessions, which include an overview of INCOSE and a featured guest speaker.

Launching a new lapsed member recapture campaign in 2022, we made use of a new tool called PropFuel, which enables dialog with member and past members. Through small, one-button interactions, we were able to understand our lapsed members better, and also invite them to rejoin INCOSE. We found that about half of our lapsed members didn't know they had lapsed, and that many of them wished to rejoin. In fact, through our campaigns in 2022, over 400 lapsed members have rejoined INCOSE.

Our increased use of social media in 2022, and the dramatic increase in followers of our groups on LinkedIn and other sites, supported new member recruitment. We also offer our New Member Welcome Center café programs to new members through social media to educate non members on what INCOSE is all about.

By Dr. Barclay Brown,ESEP; INCOSE Chief Information Officer

New Membership Webpage

Ian Presland identifies numerous benefits of INCOSE membership

Ian Presland, editor and one of the primary authors of the INCOSE Systems Engineering Competency Framework and upcoming Assessment Guide, did not originally think of himself as a systems engineer.

He had earned a bachelor's degree in Electronic and Electrical Engineering at University of Bristol and had started his career at British Aerospace (now BAE Systems) as an electrical engineer.

His ideas changed when he was hired by Computing Devices Canada (now General Dynamics Canada).

"*In the U.K. I had always thought of myself as an electronics or firmware guy,*" Presland said. "*However, CDCs focus on systems engineering was so great, it was almost inevitable that I eventually 'found my calling' as a systems engineer.*"

He spent six years in Canada, spending the majority working on bigger-picture projects as a senior systems engineer.

"*After returning to the U.K., my career was focused solely on systems engineering*," Presland said.

He worked for companies including Thorn Transit Systems International (later Cubic Transportation Systems), Omitec Instrumentation, and then spent 15 years at Thales U.K. before starting his own consulting firm, Charterhouse Systems Limited, in 2015.

Presland also has been active in INCOSE for more than a decade.

"It's such an interesting community. You meet people in person quite rarely," he said. *"When you do, although you spend a lot of time talking to them about technical stuff, you often get to know them socially very quickly because everyone is at a loose end and trying to make the most of a few days away from the day job."*

Presland said he highly recommends the organization for being forward-thinking in professional development in terms of publications, resources, and in its personal networking opportunities.

"I've found everyone to be really friendly, whatever background they are from," he said. *"People talk about INCOSE being a family. It really is. INCOSE allows you the opportunity to make quite different friendships with people perhaps you wouldn't normally have come across in your normal day job."*

By Beth Beth E. Concepción

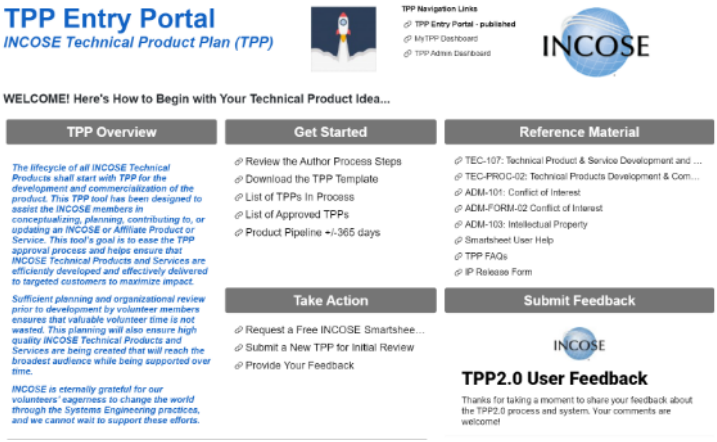
Welcome to Your INCOSE Technical Product Development Process

Over the last years, INCOSE has created a set of well regarded, highly impactful, and generally popular Technical Products.

Some of the recent best sellers include:

- INCOSE SE Handbook 1st through 4th Editions (with 5th Edition coming soon!)
- Vision 2025 and Vision 2035
- Guide for Writing Requirements
- Letters to My Younger Self
- And too many more to mention!

These products are a major factor in INCOSE's increasing success and in our position the pre-eminent systems engineering society in the world.



With this in mind, the Technical Operations team has been working over the last few years to improve our Technical Product development process, with goals including:

- Reduction in wasted efforts
- Improved efficiency and reduced development time
- Improving assurance that technical products address stakeholder needs
- Improve awareness of Technical Product development process

The goal of this article is to address the fourth goal, improving awareness of the Technical Product development process, to include supporting resources and tools.
As a starting point, the figure shows our INCOSE Technical Product Pipeline, which can be found at www.incose.org/product-pipeline. This report shows the products that were delivered in the last year, or are projected to be delivered in the next year. As you can see, our product developers have been very busy!

You might be asking "How do these products get created? How do I get involved?"

Great Question!

You'll find a wealth of information at the INCOSE Technical Product Planning portal page, www.incose.org/TPP. This is the central portal where we store or link to everything you need to create a successful product, ranging from INCOSE policies, author instructions, downloadable templates, and access to input tools. But first, where do the ideas for products get created? (Another great question!)

1. Concept Definition

Historically, most INCOSE technical products were developed based on ideas generated bottoms-up by the team members themselves. Groups, like the Requirements Working Group, perceived a need or an opportunity, and agree that they wanted to put in the effort to create an INCOSE Technical Product (like the Guide for Writing Requirements). While some products were envisioned elsewhere, the majority of our products were invented using this bottoms-up approach.

In the last year, we've added a new dimension – Stakeholder Needs. While we've received the INCOSE Corporate Advisory Board Statement of Needs for a number of years, this year we formalized the processing and analysis of these needs, and we've opened the 'call for needs' to the general INCOSE population. In the last year we've

created a Needs database (if you have an idea for an area where we need additional technical products, you can enter it right here http://www.incose.org/needs). This needs database provides a second source of inputs, and the Impactful Products Committee analyzed these needs and worked to address each item, either by allocating it to an existing product, or working to create a new product concept and find the appropriate teams within INCOSE to develop it.

2. Proposal

Once a concept is defined (in whatever format) for a product, the next step is submit a formal proposal via the INCOSE Technical Product Plan (TPP). The purpose of this step is to ensure that all products created by INCOSE teams on behalf of INCOSE are on-target, high quality, accurate, and suitable for publication by INCOSE.

To achieve this goal, we've created a three-step process:

- Draft TPP and Submit - The author drafts the TPP using the TPP template and following the instructions on the TPP Entry Portal page. This addresses a number of areas, including:
  - Product Concept and Need
  - Product Development Approach
  - Product Maintenance and Retirement Plan

- Impactful Product Committee (IPC) reviews
  - The Impactful Products Committee was chartered to focus on making INCOSE products truly impactful. The IPC has established a basic process framework intended to ensure that all products with the INCOSE logo are deserve of that brand
    - Our Marketing and Communications (MARCOM) Director is a member of the IPC, which ensures that MARCOM is engaged early as products are defined, to allow us to design and launch these products with the 'right' level of Marketing splash.
  - Within the TPP process, the IPC reviews the TPP to ensure that the product would be value added to our community, that the proposal is complete and logical, and that the development approach is reasonable and likely to succeed.
  - IPC provides feedback as needed to ensure the TPP is complete and clear.
  - IPC defines product price and marketing level
  - Author updates TPP

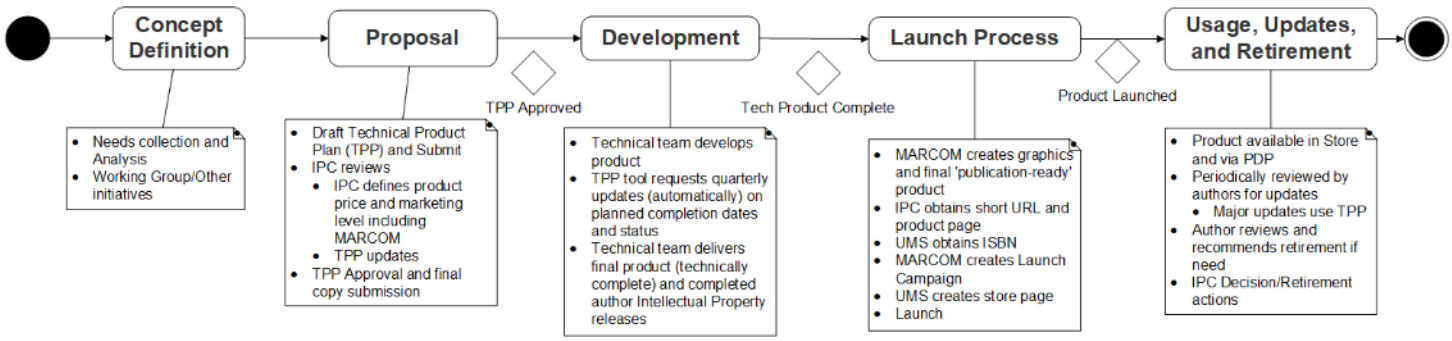
- TPP Approval and final copy submission - after these updates, the IPC approves the TPP and product development starts.

3. Development

Product development can take many forms, depending on the product, the team type, and the team's business approach for product creation. The INCOSE Technical Product development process does not try to constrain this inherently creative process.
Instead, the IPC looks for two things during this process:

1. Quarterly status updates – the TPP tool will automatically request updates from the lead author relating to target completion date and any other status changes (decided by author).

INCOSE Technical Product Development Process

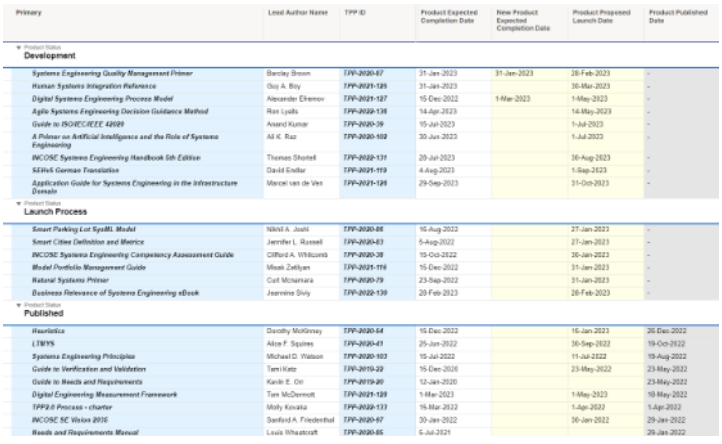


2. When the product is complete, deliver the final product and the completed Author Intellectual Property release forms. This is critical as INCOSE cannot publish a product with this Intellectual Property release.
3. Launch Process

While the technical content in the product is complete at this point, there is still a good bit of effort needed before we can roll-out an INCOSE-class technical product. Over the last year, we've grown and improved our capabilities and now our technical product benefit from world class artwork, page layout, and marketing campaign roll-outs, thanks to the leadership of our Marketing and Communications Director, Honor Lind.

These efforts are high impact, but must be planned and coordinated for each product. During the launch process, the following activities are coordinated:

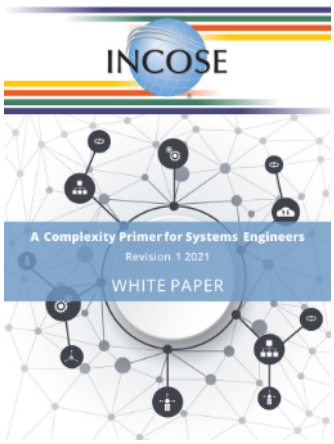
- MARCOM creates graphics and final 'publication-ready' product
- IPC obtains short URL and product information web page
- UMS (Central Office) obtains ISBN
- MARCOM creates Launch Campaign
- UMS creates a page in the INCOSE store And then, finally – Product Launch! (with an accompanying Press Release).

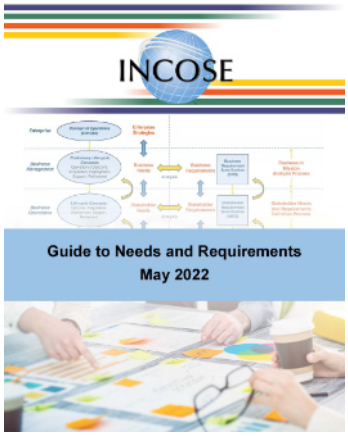


Primary	Lead Author Name	TPP ID	Product Expected Completion Date	New Product Expected Completion Date	Product Proposed Launch Date	Product Published Date
Development						
Systems Engineering Quality Management Primer	Barclay Brown	TPP-2020-87	31-Jan-2023	31-Jan-2023	28-Feb-2023	-
Human Systems Integration Reference	Guy A. Boy	TPP-2021-125	31-Jan-2023		30-Mar-2023	-
Digital Systems Engineering Process Model	Alexander Efremov	TPP-2021-127	15-Dec-2022	1-Mar-2023	1-May-2023	-
Agile Systems Engineering Decision Guidance Method	Ron Lyells	TPP-2022-136	14-Apr-2023		14-May-2023	-
Guide to ISO/IEC/IEEE 42020	Anand Kumar	TPP-2020-39	15-Jul-2023		1-Jul-2023	-
A Primer on Artificial Intelligence and the Role of Systems Engineering	Ali K. Raz	TPP-2020-160	30-Jun-2023		1-Jul-2023	-
INCOSE Systems Engineering Handbook 5th Edition	Thomas Shortell	TPP-2022-131	28-Jul-2023		30-Aug-2023	-
SEHv5 German Translation	David Endler	TPP-2021-119	4-Aug-2023		1-Sep-2023	-
Application Guide for Systems Engineering in the Infrastructure Domain	Marcel van de Ven	TPP-2021-126	29-Sep-2023		31-Oct-2023	-
Launch Process						
Smart Parking Lot SysML Model	Nikhil A. Joshi	TPP-2020-86	16-Aug-2022		27-Jan-2023	-
Smart Cities Definition and Metrics	Jennifer L. Russell	TPP-2020-83	5-Aug-2022		27-Jan-2023	-
INCOSE Systems Engineering Competency Assessment Guide	Clifford A. Whitcomb	TPP-2020-38	15-Oct-2022		30-Jan-2023	-
Model Portfolio Management Guide	Mosé Zeitlyan	TPP-2021-116	15-Dec-2022		31-Jan-2023	-
Natural Systems Primer	Carl Mcnamara	TPP-2020-79	23-Sep-2022		31-Jan-2023	-
Business Relevance of Systems Engineering eBook	Jeannine Siviy	TPP-2022-139	28-Feb-2023		28-Feb-2023	-
Published						
Heuristics	Dorothy McKinney	TPP-2020-64	15-Dec-2022		15-Jan-2023	26-Dec-2022
LTBYS	Alice F. Squires	TPP-2020-41	25-Jun-2022		30-Sep-2022	19-Oct-2022
Systems Engineering Principles	Michael D. Watson	TPP-2020-103	15-Jul-2022		11-Jul-2022	15-Aug-2022
Guide to Verification and Validation	Terri Katz	TPP-2019-22	15-Dec-2020		23-May-2022	23-May-2022
Guide to Needs and Requirements	Kevin E. Orr	TPP-2019-20	12-Jan-2020			23-May-2022
Digital Engineering Measurement Framework	Tom McDermott	TPP-2021-120	1-Mar-2023		1-May-2023	10-May-2022
TPP2.0 Process - charter	Molly Kovalik	TPP-2022-133	15-Mar-2022		1-Apr-2022	1-Apr-2022
INCOSE SE Vision 2035	Sanford A. Friedenthal	TPP-2020-97	30-Jan-2022		30-Jan-2022	29-Jan-2022
Needs and Requirements Manual	Louis Wheatcraft	TPP-2020-85	6-Jul-2021			29-Jan-2022

4. Usage, Updates, and Requirement

At this point, our shiny new product is available for purchase and free download for our members (typically free – one of our membership benefits!). It will be available in the INCOSE Store, and also





accessible via the INCOSE Professional Development Portal.

As Systems Engineers, we know this is not the end of the process. In this phase, product owners need to periodically review the product and then either consider a revision or potentially retirement. If the product is to be revised, we will use the same TPP process as we discussed above. If the product is recommended for retirement, the IPC will be **notified by the author team and make any final decisions.**

Summary

In this article, I've tried to capture the key elements of the product development lifecycle. INCOSE creates some great technical products, my hope was to give you a peak behind the scenes into this development process. If you are a potential product author, I hope I provided you a good starting point for understanding the process. And finally, as you can see, it takes 'many hands to make light work,' and we have lots of opportunities in this area for motivated volunteers to jump in and help make us even more successful.

By Tony Williams, ESEP - INCOSE Product Champion Assistant Director and INCOSE New Chapter Coordinator

Technical Publications Webpage

INCOSE Store

Updates from INCOSE's Technical Leadership Institute (TLI)

Workshops, workshops, workshops! The New Year always begins with a bang for the TLI, and 2023 is no exception. With workshops for two cohorts, engagement at IW 2023, and the opening of nominations for Cohort 9, the TLI is running fast.

The eighteen members of Cohort 7 are nearing the end of their initial two-year experience as they drive towards induction as full members of the Institute in July 2023. For the last six months, the cohort has been working on three major projects aligned with their leadership interests: A Systems View of Career Development for Systems Engineering Leadership, Future Trends Influencing Technical Leaders and Technical Leadership, and A Systemic Model of Leadership Approaches. The cohort gathered for a virtual workshop in January to reflect on insights gained through these projects, both for the topics identified and the experience of leaders working together in the pursuit of shared interests. The importance of passion, balancing synchronous and asynchronous collaboration, playing to strengths (your own and those of your teammates), seeking to understand, and grace all emerged as themes that we carry forward as we continue to learn together.

While the cohort may be looking towards induction, their work is far from complete. Members have taken ownership of their individual learning journeys, identifying the kind of leaders they can be and the experiences necessary to grow. Working together, they continue to advance their major projects furthering the insights and learnings they seek. Looking beyond themselves, they are identifying audiences that would most benefit from their learnings – the TLI, the greater community, their home organizations, or a combination thereof – and developing engagement and publication plans to share the

TLI Members at IW2023

knowledge. IS 2023 plays a part in these plans as two projects will be shared in Honolulu.

In parallel, **Cohort 8** is now hitting their stride as they completed their second week-long workshop in January. Twenty-two members and three coaches spent fifteen hours learning together as they engaged in new topics, conducted collaborative exercises for deeper exploration, and reflected together on the insights gained. With topics ranging from 360 degree feedback to understanding cognitive biases and the power of shared model building as sense-making, we set the foundation to explore our individual leadership philosophies and definitions of success. Collaboratively, we are exploring the role biases play in judgment and decision-making.

With two major workshops (fifteen hours each in July and January) plus individual and collaborative projects, Cohort 8 established a shared foundation for its journey of learning together. We now begin to adapt that learning journey based upon the cohort's interests and needs. A set of burning questions emerged as we identify the knowledge and experiences we most value in our TLI journey forward. These burning questions will help us shape the major projects we will undertake to gain the insights we seek and make a greater contribution around the topic of technical leadership.

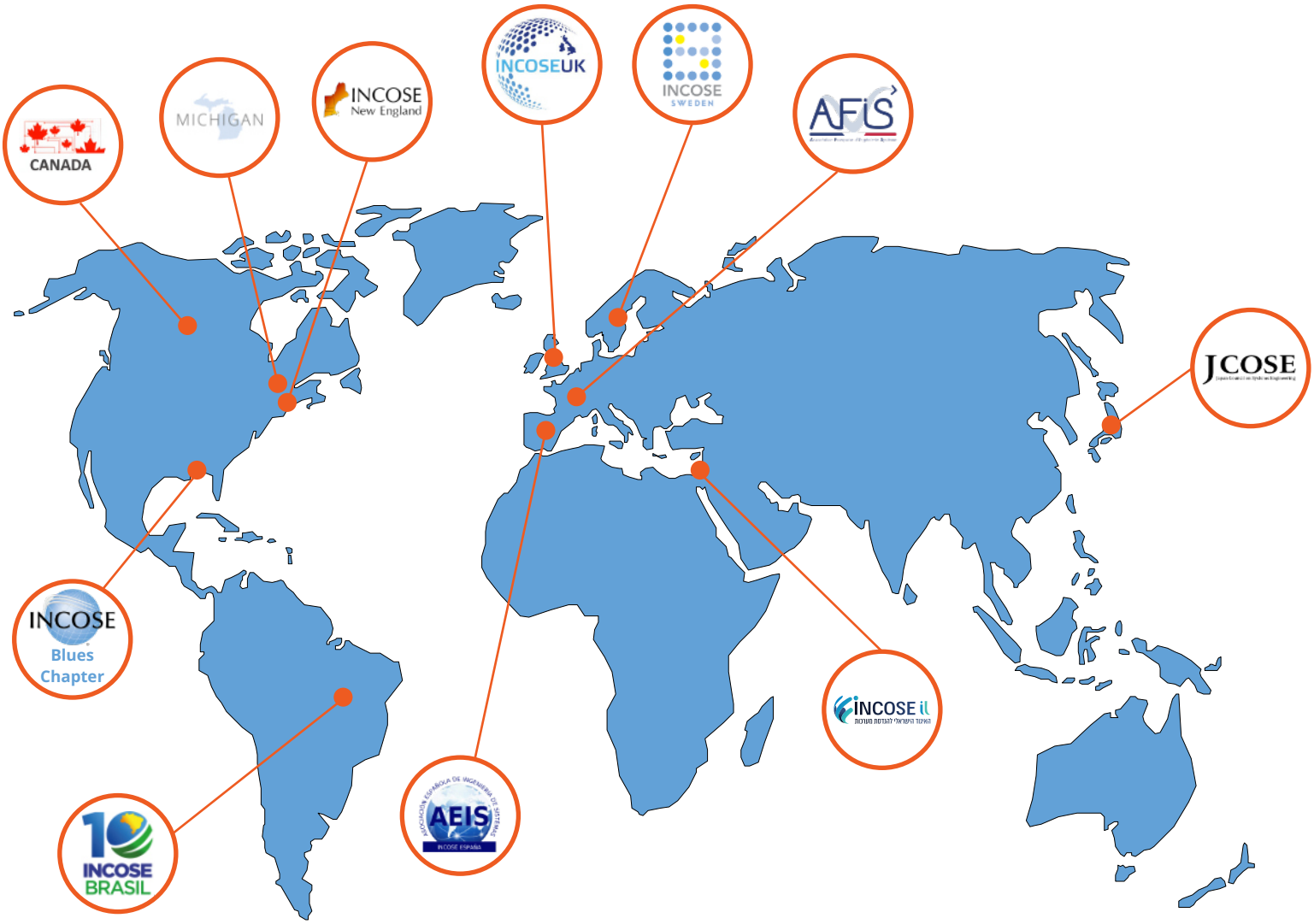
It is now time to identify members of the next cohort of the Technical Leadership Institute. Nominations for Cohort 9 formally opened at IW 2023 as we conducted information sessions for all the nominators. Any INCOSE member is eligible to participate in this virtual, no-cost global learning network of individuals seeking to improve their leadership skills in an open, collaborative environment. All it requires is a nomination from an INCOSE leader (an INCOSE Board Member, Director, Associate or Assistant Director, Chapter President, or member of the Corporate Advisory Board), an application package, and a commitment to learn together as we enhance our knowledge, skills, and abilities in the area of technical leadership. Nominations close every year on 31 March with this year's kickoff workshop scheduled for 19-23 June. For more information visit https://www.incose.org/about-incose/tli.

By David Long, ESEP - TLI Coach, Director for Strategic Integration

TLI Webpage

CHAPTER UPDATES

Click on the chapter logo to go straight to their update



Brazil Chapter: INCOSE Brasil

The INCOSE Brazil chapter is launching the first cohort to support the community in preparing for the SEP exam. The group has been selected among ASEP and CSEP candidates from different backgrounds.

The organization and leadership are done by Raquel Hoffmann, CSEP and Certification Director of INCOSE Brazil, and Guilherme Pimentel, member of the INCOSE Corporate Relations group and visionary of this initiative. The first group, with 16 participants (10 CSEP candidates and 6 ASEP candidates), will meet every week starting February 27th. The schedule will cover the Systems Engineering Handbook v. 4 in 12 weeks. An experienced guest is invited to speak about the week's theme and bring a more practical perspective on the handbook processes.

The target is to have all 16 participants taking the exam in the first week of June. 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. Another extended group with 15 participants working in the same company is being created. INCOSE Brazil will support this group by sharing the schedule, plan, material, and co-leadership.

Leaders, guests, and reviewers are volunteers willing to work together to increase the number of Systems Engineering certified professionals in the Brazilian community. INCOSE Brazil appreciates all support and enthusiasm of the volunteers. A special thanks to Steve Ratts (and Courtney Wright, who made this bridge) for sharing about the Florida SEP Cohort. The chapter "INCOSE SEP Cohort Guide" in the book "Perspectives on Systems Engineering from Florida's Space Coast" was written by Steve and is an excellent source of information about leading a Systems Engineering cohort. INCOSE Brazil is looking forward to the first SEP cohort!

By Raquel Hoffmann - Certification Director of INCOSE Brazil.

INCOSE Brasil Website

Blues Chapter

Blues Chapter arranges strong program with diverse speakers, among other initiatives

The INCOSE Blues Chapter is embarking on an ambitious program for 2023 that includes a robust program of events, a professional development workshop, a mini conference for students and professionals, and a year-end social event tentatively to be held at the INFINITY Science Center at NASA Stennis Space Center.

"*Our vision for this year is to define the Blues Chapter's value proposition and deliver on it,*" said Chapter President David Gross.

The Blues Chapter serves the Gulf Coast area of Alabama, Mississippi and Louisiana. The chapter works closely with the student chapter of INCOSE at the University of Alabama and promotes Systems Engineering in numerous venues.

Upcoming lectures include "The Wrong Ship at the Right Time: USS Monitor in the Civil War" by Larrie Ferreiro, Ph.D., of the Naval War College on April 20, and "Quality Initiatives in Public Health Care" by Alberto Araujo of the Florida Department of Health on July 20.

Blues Chapter Webpage

Canada Chapter: INCOSE CANADA

"Terry Fitzgerald, INCOSE Canada Chapter VP, briefed the Canadian Surface Combatant PMO team on the value and opportunities of INCOSE membership on January 12th after the invitation of the PMO team lead, Mr MacDonald.

A compelling case was made on the benefits of the SEP certification process and INCOSE Canada Chapter as a supporting local partner in their journey towards certification.

INCOSE Canada Chapter, after many years hibernating in the Canadian boreal forests, hits the road running in 2023 after calling in a vibrant executive board and directors, in October 2022, under the leadership of Ray Barton, Canada Chapter President. Under the auspices of Tony Wu, Ivan Taylor and Ivan Rodrigues, Canada Chapter has offered regular monthly webinars on topics ranging from Requirements Engineering (Jan 9th, presented by Ms Majd), Robust System Architecture (Feb 13th, presented by Mr Dano) and Unified Architecture Framework (provisionally Mar 13th, presented by Mr MacDonald) to its increasingly diverse membership. In other news INCOSE Canada Chapter's webmaster, Stéphane LaCrampe, has spearheaded the migration of the Chapter's former Sitefinity site to the new platform reporting any bugs in the transformation to INCOSE IT to fine tune future migrations.

INCOSE Canada Webpage

New England Chapter

INCOSE New England Monthly Chapter Engagement Schedule

The INCOSE New England Chapter invites you to their monthly chapter engagement webinars!

Virtual Attendance via WebEx. To register and find more information visit www.neincose.org

INCOSE New England Website

Date	Time	Speaker	Topic
Tue, Feb. 21, 2023	6:30 PM EST	David Long	Systems Engineering your MBSE and Digital Engineering Deployment
Tue, Mar. 21, 2023		Eric Dano	A Primer on ConOps Development
Tue, Apr. 18, 2023		TBD	TBD
Tue, May 16, 2023		Olivier L. de Weck	Recent Trends in Earth to Orbit Launch

Michigan Chapter

INCOSE Michigan Chapter Past President Robert F. Bordley, Ph.D., has won the 2023 Gold Award from the Engineering Society of Detroit Affiliate Society Council.

The Gold Award recognizes the top candidate selected from among submissions solicited from ESD's nearly 100 Affiliate Societies. The reception will be held March 15 at the ESD's headquarters in Southfield, Michigan. The announcement of his win appeared in the Spring 2023 edition of Tech Century, published by the Engineering Society of Detroit.

Bordley is an active member of the INCOSE's Academic Council (representing University of Michigan), a founding team member of the INCOSE Student Career Fair, and founder/advisor of the INCOSE University of Michigan Student Division. He also just took on the leadership role of Assistant Director, Special Projects and Liaisons.

"*The closest award to 'Engineer of the Year' in the State of Michigan is the Gold Award*," said Jack Stein, Past President of the Michigan Chapter. "*Much thanks to [Michigan Chapter President] Dean Norfleet and others on the INCOSE Michigan Chapter Board of Directors for the many hours required to prepare Bob's Gold Award submission package. It was quite an extensive package!*"

Michigan Chapter Webpage

Robert Bordley Takes on New Leadership Role

Robert F. Bordley is the new Assistant Director, Special Projects and Liaisons, for INCOSE. In this role he plans to centralize the virtual career fair, among other initiatives. Bordley also is an active member of the INCOSE's Academic Council (representing University of Michigan), a founding team member of the INCOSE Student Career Fair, and founder/advisor of the INCOSE University of Michigan Student Division.

In addition, Bordley just won the 2023 Gold Award from the Engineering Society of Detroit Affiliate Society Council. The Gold Award recognizes the top candidate selected from among submissions solicited from ESD's nearly 100 Affiliate Societies.

He is Professor of Engineering Practice at the University of Michigan, Ann Arbor, and Director of their Systems Engineering and Design Program. Bordley previously worked at General Motors in several management roles and was the program director of Decision, Risk and Management Science at the National Science Foundation. He also worked at Booz-Allen-Hamilton on major Army procurement trade studies. He has published almost a hundred publications on decision analysis involving targets, expectations, suspicion, time delays, problem framing, and visual decision making.

Bordley is a Fellow of INFORMS, the American Statistical Association, and the Society for Decision Professionals and is active in many professional societies. He has received many awards from GM, numerous academic awards, and two professional awards: Michigan INCOSE Lifetime Achievement award and the Gold Award from the Engineering Society of Detroit.

He earned an M.S. in Electrical and Systems Engineering from Michigan State University and a Ph.D., M.S., and M.B.A. from the University of California, Berkeley.

Japan Chapter: JCOSE

JCOSE
Japan Council on Systems Engineering

The headline activities over the past few months are as follows:

1. Release of Japanese translation of SE Vision 2035 (available free on JCOSE website),
2. Virtual workshop #9 centred around presentation by Akira Ishizaka on example of UAF usage – MaaS level 4 for snowy regions
3. Two-day intermediate level course on Systems Engineering on February 15th – 16th as part of continued collaboration between JSAE and JCOSE
4. Virtual workshop #10: topics to share from IW presented by four JCOSE members (for which we have a new workshop record attendance of 90!).

By Maz Kusunoki - Chapter President,
m.kusunoki@jcose.org

JCOSE Website

Serge Landry, Director of Asia Oceania Sector has shared with us his favorite mode of transportation, a unicycle!

INCOSE

EMEA WSEC 2023
Europe, Middle East, Africa
HYBRID EVENT
Workshop and Conference
Sevilla, Spain - 24-26 April, 2023

Keynote speakers

Gerhard Krinner
Directeur de recherche
(senior scientist) - CNRS- IPCC
CNRS, Grenoble Alpes University, Grenoble INP and IRD, the Institute of Environmental Geosciences (IGE)

Some key messages from the 6 th IPCC Synthesis Report

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. It provides regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation. Acknowledged as authoritative source of scientific information by all countries, the IPCC reports are the scientific basis for international negotiations on issues related to climate change.
The reports are written by several hundreds of internationally recognized, actively publishing scientists in the domain. The 6 th assessment cycle (2015-2023) consists of 3 Special Reports, 3 Working Group Reports, and a final Synthesis Report (to be published in March 2023), together building on the analysis of about 70000 scientific publications.
The IPCC Working Group Reports published in 2021 and 2022 have clearly shown that climate change has unfolded as predicted by the scientists already more than 50 years ago and is now a pressing reality, and that the human responsibility in the ongoing changes is beyond any reasonable doubt. But they have also shown that ambitious climate action can allow us to limit future climate change. From my viewpoint as a physical climate scientist, I will briefly present overarching key findings of the Synthesis Report that aims at bringing together the main findings of the 6 the assessment cycle, including knowledge on risks related to climate change and options for adaptation and mitigation.

Cecilia Haskins
ESEP, Associate Professor of Systems Engineering, emerita
NTNU and USN, Norway

Systems Engineering support for Industry to meet UN SDG

Industry is an important contributor to value creation in today's' society. But business is also the source of undesired social impacts such as environmental degradation and exploitation of workers.
Traditionally, society's response to the most severe impacts, has been to establish laws and regulations. However, negative consequences persist even when firms operate within established limits. This creates a dilemma in defining the role of industry to sustainable development as outlined in the UN SDG and considering the role of systems engineering in addressing this dilemma. This keynote offers frameworks and a toolset supported by systems engineering principles and practices to assist the business transition to sustainability drawing on recent research and cases of successful
transitions.

David Long
IESEP, NCOSE Director for Strategic Integration
President, Blue Holon

Leading for a Sustainable Future

Complexity is a dominant theme of the 21st century as we bemoan that the world around grows ever more complex. We create much of this complexity ourselves as we leverage new technologies in pursuit of larger, more audacious undertakings. At the same time, some of what we observe as new complexity was always present. We simply were not aware of it.
Our interrelationship with the world around us falls into the category of complexity that has always been present but is only now entering (or re-entering) our consciousness. In pursuit of our more audacious goals, we often neglect or intentionally deprioritize sustainability. Today we recognize that this is not a mindset we can continue.
As systems engineers, what can we do to create a better tomorrow for ourselves and future generations? The answer is far more than we might think. Leveraging our principles and positions, we can have a unique and positive impact as we address the question of sustainability. We can lead through influence, identifying and exploiting specific intervention points as we look upstream, downstream, and outward at the product, enterprise, and societal levels. We can embrace the challenge before us,
leveraging our strengths in combination with those around us, to lead for a sustainable future.

Prepare your travel

Register: how much does it cost?
- Member: In-person: 500€ - Virtual: 200€
- Non Member: In-person: 650€
- Virtual: 260€

Make your hotel reservation
All activities will take place at the Barceló Sevilla Renacimiento. Book your room at the group rate by Monday, April 17, 2023.

Enjoy Sevilla
Let's discover Sevilla, the birthplace of Flamenco and take part in the Feria de Abril (one of the biggest popular events taking place every year in Spain).

incose.org/emeawsec2023

France Chapter: AFIS

AFIS Academy-Industry Meeting – 10th edition

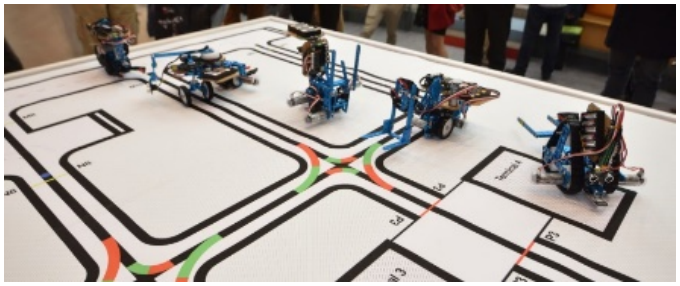
The largest System Engineering national event in France - the 10th edition of AFIS Academy-Industry Meeting - took place from 6 to 8 December 2022, at the Institut National des Sciences Appliquées de Toulouse (INSA Toulouse, France). This event gathered more than 170 academic and industrial participants from the Systems Engineering French community, around a particularly topical theme: Systems Engineering supporting uncertain environment.

This 10th edition of AFIS Academy-Industry Meeting, grouped five different events:

- RobAFIS™ Competition - Final phase of the student competition (collaborative implementation of engineering processes and methods on a complex system), and Awards ceremony. (replay is available online)
- Pre-forum - An afternoon prior to the forum, dedicated to a theme speaking to local industrialists.
- Forum - 2 days of debates on systems engineering, combining industrialists and academics.
- Doctoral Seminar - An opportunity for PhD students who have not yet defended their thesis to present their work in the field of Systems Engineering.
- AFIS Thesis Award - Valorisation and reward of doctoral work, in the field of systems engineering, of high scientific quality and with a real industrial interest to three young PhDs who have defended their thesis between December 2020 and 15 November 2022.

This great success has encouraged us to repeat this exercise and make it a permanent feature. From now on, the AFIS will organise a major annual event – the AFIS Congress- dedicated to Systems Engineering, allowing us to present all the work of our association during the year. This will be our big annual Rendezvous... to be continued.

This theme of the Academy-Industry meetings has emerged from all the changes we have undergone in recent years: whether it be the Covid-19 health crisis, or the recent political events of the war in Ukraine, which have underlined the criticism of our external dependence, and the importance of our energy, technical and industrial sovereignty. All these unforeseen events in our environment have had major consequences on our daily life, but also on our organisations and more generally on the politics and economy of our country.



Some of these consequences have changed the way organisations function, with a spectacular increase in remote working, the development of digital solutions and a new form of collaboration. Without counting the study of energy management in companies and factories, which, because most of them have not made a significant effort upstream to respond to the environmental and climatic challenges of sustainability, have found themselves obliged to adhere to the

strategy of energy sobriety, for economic and political reasons.

Certain crises thus appear to be real drivers of technological and societal progress: Covid-19 demonstrated that it was possible to reduce the development time of a vaccine by a factor of 10. Similarly, the fossil fuel crisis has boosted the sale of hybrid and electric vehicles, supporting the ecological transition of our transport. From these crises have emerged real technological innovations, driven both by the massive exploitation of data, accessible everywhere and to everyone, and by the development of artificial intelligence, to analyse, control and react more quickly. And these new advances are constantly calling for others, for example the analysis of this massive data will require computing power to make real time possible, which will be possible thanks to the development of quantum computers...

All these unpredictable changes are having a major impact on our society, not only in terms of its functioning, but also in terms of its needs and aspirations, leading it towards a more united, more sustainable and more responsible society, where the human factor has its rightful place...

In this context, it is legitimate to ask the following questions: how can systems engineering help to face these current and future challenges? What methods and tools can it propose to provide more reactive solutions and accelerate technological progress, without causing undesirable rebound effects?

As a result, these Academy-Industry meetings were an opportunity to reflect and discuss together on several questions emerging from this uncertain environment:

- **How to manage risk in the development of systems?**
- **How to make decisions?**
- **How can we guarantee the results of the design?**
- **How to reduce development time / reuse to be more reactive?**
- **How can we innovate sustainably?**
- **Finally, how can we teach to think in systems and uncertainties?**

Moreover, this year again, the RobAFIS™ competition allowed students from 7 schools to propose new taxibots, by collaboratively implementing the processes and methods of systems engineering. Doctors and doctoral students whose research work addresses a systems engineering theme were also honoured during the Doctoral Seminar and Thesis Prize.

Finally, these 10th meeting has thus allowed us to finally meet again around 9 conferences, 8 workshops and a round table, led by no less than 31 speakers. They were opportunities to reflect and exchange ideas on the many questions and solutions that Systems Engineering can provide. They led to the emergence of new themes and subjects of study which will be proposed within the AFIS working groups, or other event formats, other ways of working together will be created in 2023 in order to pursue our ambitions and make AFIS our preferred meeting place for Systems Engineering: a Think-Tank, a Do-Tank, Agora, Debates, etc., all of which will be great new features for 2023 !

By Olivia Penas - Director for Academic Matters - AFIS Chapter, vp-er@afis.fr

AFiS Website

Israel Chapter: INCOSEIL

Women Advancing Systems Engineering

The Gordon Center for Systems Engineering with the partnership of the Israeli Chapter of INCOSE -INCOSE_IL, the companies RAFAEL & IAI, and IEEE Israel organized two consecutive events on January 24 - 25, 2023. The first event was a full-day conference hosted at the Gordon Center for Systems Engineering at the Technion, Israel, and the second event was a seminar hosted at the Israel Airforce Center in Herzliya, Israel.

The theme for the first day conference was "Women Advancing Systems Engineering" with about 200 participants from a variety of industries and companies. The day started with registration and a networking reception. In the opening session, two Excellent Systems Engineering Awards donated by the Joseph Lewin family were presented to _Irith Naveh (RAFAEL) and Viki Alman Lezevnick (IAI). Following the opening session, ten leading women systems engineers presented throughout the day and shared their advanced research and practice in the following areas of expertise:

- Engineering complex photonics systems – Prof. Alina Karabchevsky
- Systems engineering leadership – Prof. Alice Squires
- Practicing systems approach in Industry 4.0 – Mally Bitzur-Parnes
- Practicing deep tech in systems engineering – Dr. Amira Sharon
- Situation adapted systems engineering – Dr. Judith Hochermann-Frommer
- Systems engineering & IMPACT – Dr. Sharon Shoshany-Tavory
- Integration of Human-System consideration in ventures – Dr. Nirit Gavish
- Integrating innovation in systems engineering – Dr. Avital Shrift
- MBSE as a decision support system – Dr. Natali Levi-Soskin
- Developing and engineering concepts of operation in projects and organizations – Dr. Miri Sitton

In the early afternoon of the conference, a panel of systems engineers with a wide range of years of experience, conducted a lively discussion with the theme "I Did it My Way". The panel was moderated by Dr. Sharon Shoshany-Tavory. Each panelist introduced themselves and shared some of their personal experiences and perspectives on various topics including the value of diverse teams, the technical expertise of women, and the future of women and men in STEM fields.

In conjunction with this conference day, a challenges solutions competition in smart transportation & green challenges was conducted among women engineering students. Each student presented a poster of the smart transportation challenge and the proposed solution. The winners

in this competition were announced and presented during the concluding session of this conference day. The winning poster was: "Social System for Energizing Electrical Vehicles", presented by Michal Broder. Each speaker at the conference was given a red rose.

Insights from the conference included the following:

- This conference day was successful in presenting the achievements of women in systems engineering.
- These women can be considered as role models for all systems engineers in their achievements and their way towards excellence. We think it would be great to talk about the idea of this type of conference – so that the younger generation can envision themselves as systems engineers, especially young women.
- We believe the conference itself created a lot of positive energy in the community, first to think about the value that women bring to systems engineering that can sometimes be overlooked, next to consider what it would be like without women (loss of creativity, loss of ideas, loss of higher quality products and services that come from diversity in the team), and third that women want to be valued for their expertise.
- We would personally like to say that this conference is an example to the global systems engineering community. The event represents the start of a trend around the world to recognize and celebrate the significant contributions of underrepresented members of the systems engineering community, not just women, in support of the future of systems engineering.

The next conference day of the Gordon Center is planned for June 20, 2023 with the theme: **Systems thinking & engineering social & environmental systems with IMPACT.**

The second-day seminar was conducted primarily for INCOSE_IL members with the theme "**Applying Data Sciences for Systems Engineering**". Prof. Alice Squires presented "Data-driven Decision Analysis for Systems Engineers", and Dr. Yaniv Mordecai presented "Substantiating Data-Driven System Architecting with Category Theory". These two talks generated some excellent questions and responses and a vivid conversation among the several dozen participants of the seminar.

By Dr. Avigdor Zonnenshain - The Gordon Center for Systems Engineering, Technion, Israel; Prof. Alice Squires - INCOSE EWLSE; Dr. Yaniv Mordecai - IEEE Systems Council Israel Chapter & Dr. Sharon Shoshany-Tavory - Technion

INCOSEIL Website

Spain Chapter: AEIS

- The INCOSE Chapter of SPAIN was represented by Anabel Fraga at the IW2023. She participated in the EMEA events as the chapter representative, also on the meetings, and coordination of the EMEA WSEC 2023 event. Moreover, she was involved during the IW in the meetings of the Technical Program for the IS2023 as co-Chair with Robert Wirthlin, Tj Ferrel, Krystal Porter, Donna Long, and the KMD team.
- The chapter is hosting the Systems of Systems event with INDRA, at their buildings the February 16th of, 2023. It will be an event for practitioners and will also offer the opportunity to take the SEP exam during the event to the interested participants.
- International Women's Day organized by EWLSE, is also a priority of the chapter. speakers from the three sectors will participate; the event will be recorded. Diversity, Equity, and Inclusion are one of the priorities for the chapter board at this moment.
- The EMEA WSEC 2023, hosted in Seville, SPAIN, next April 24-26th, 2023, has closed submissions, and the review process has started. The hotel and registration will be open soon. We want to thank the Team from various Chapters of EMEA that collaborated and committed efforts to this committee.

AEIS Website

Sweden Chapter: INCOSE Sverige

For the Swedish chapter, 2023 has been a very active year so far. On January 12th Tom Strandberg hosted the first fireside chat with INCOSE Fellow Jon Holt. The Nobel laurates give their Nobel lectures, and it is only natural that there should be similar event for INCOSE's Fellows. The chapter plan for more similar events.

On February 6th the chapter organised a full day workshop with three focal areas:

- Adapting Systems Engineering led by Marianne Johansson
- Large scale MBSE led by Jan Johansson
- Chapter outreach led by Åsa Jonsson.

In total 15 people attended, and the day passed quickly.

The following day an on-site SEP test was organised with 11 people taking the test.

Of course, there was also the February 16th webinar in which Jonas Hallqvist and Tom Strandberg distilled the major news and outcomes from the INCOSE International Workshop.

On March 8th the annual meeting took place. April will be comparatively calm, but in May the chapter hosts the Spring edition of the Nordic Systems Engineering Tour, together with our friends at Finse and Norsec. The call for presenters closes at April 2nd and the tour runs from May 22nd to May 24th. Don't miss the tour!

INCOSE Sverige Website

UK Chapter: INCOSE UK

ASEC 2023 Theme Announcement

The theme for INCOSE UK's Annual Systems Engineering Conference (ASEC) 2023 is '**Embracing the New Opportunities**' within which we intend to explore the following sub-themes:

- Building towards a Sustainable Future
- Strengthening the Systems Engineering Pipeline
- Systems Engineering, the Bigger Picture
- Developing the Systems Engineering Brand
- Systems Engineering Specialism: Techniques and Practises

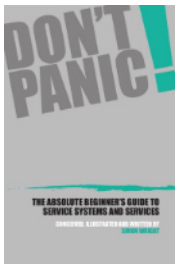
Paper Submissions to this event are now open, so please send your submissions to events@incoseuk.org.

Early Careers Forum Election Result

The Early Careers Forum (ECF) is a thriving and busy part of INCOSE UK, and we are pleased to announce that Nathan Drury has been elected the ECF Chair in an unopposed election.

We wish Nathan every success in his new role and would like to thank outgoing ECF Chair Amelia Jephson for her time, dedication and commitment she brought to the role.

Meet the Author

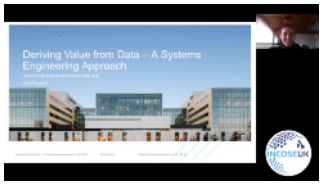


On Monday 16th January we held a Meet the Author Session with Simon Wright, Author of Don't Panic! The Absolute Beginners Guide to Service Systems and Services.

In the session, chaired by Jon Holt, Technical Director of INCOSE UK, Simon said one of the reasons for writing the book was that "In 2014 I was asked to help the Norwegian Army deliver a new Howitzer. That was the original brief, but when I got there basically, they needed a new capability and we had to look at not just delivering products but at all the services that are needed to support it over the next 30 years. That was the first time I was asked to deliver that whole capability and that whole set of services." Simon realised that his usual product-based approach did not work and, in a light bulb moment, realised that all the tools and techniques he had used over the 30 years of being a systems engineer do work for services, where services are delivering outcomes rather than outputs. Simon wanted to capture that light bulb moment for posterity.

The entire conversation, including discussions about Service Systems in general and the process that Simon went through writing the book, can be found on the INCOSE UK YouTube Channel.

INCOSE UK Paper Presentations



As part of the ASEC event, we hold some presentations in reserve in case of any last-minute changes to the schedule. Instead of letting these go unseen we featured both reserve papers from ASEC 2022 in two Zoom sessions, giving the presenters the opportunity to showcase their presentations. Both are available to view on the INCOSE UK YouTube channel.

"Delivering Value from Data - A Systems Engineering Approach" by Elizabeth Fitzpatrick.

"Stakeholder-Needs Driven Systems Development: A Flexible Automation Case Study" by Kim

INCOSE UK Website

GLOBAL CHAPTER CONFERENCES 2023

Northern Europe
Nordic Systems Engineering Spring Tour
22-24 May, Helsinki, Stockholm, Oslo

Germany
GfSE Tag Des Systems Engineering
15 - 17 November, Würzburg

Northern Europe
Nordic Systems Engineering Autumn Tour
2-22 September, Linköping, Copenhagen, Hamburg

United Kingdom
INCOSE UK Annual Systems Engineering Conference 2023
November 2023

Switzerland
SSSE SWISSED23
18 September, Zürich

USA
Western States Regional Conference
14-16 September, Tri-Cities, USA

EMEA
EMEA WSEC 2023
24-26 April, Sevilla, Spain

Australia
SESA The Austrilasian Simulation Congress (ASC) 2023
21 - 24 August, Adelaide, Australia

Asia Oceania
AOSEC 2023
11 - 14 October, Bangalore, India

AI Systems Working Group

In 2022, the AI Systems Working Group worked to help systems engineers begin to understand current AI technologies and how they might affect systems engineers, and the systems they build.

The group held a series of events called the AI Explorer Series, with each hour-long session including two short talks followed by open discussion. AI Explorer sessions were attended by over 500 people in 2022.

Topics included:

- AI Explainability and Lessons from AI in Sci-Fi
- Trustworthiness in AI Systems
- Co-Design of Trustworthy AI and Responsible AI Systems
- As-Hoc Data Exploration and Knowledge Discovery
- Large Language Models

The AI Systems WG also delivered a full day AI tutorial at IS2022, and also produced an all day series of brief talks in conjunction with the MBSE Initiative program at IW2023. Members of the AI Systems WG presented talks at the Conference on Systems Engineering Research (CSER) in 2022. The group continued work on an AI Primer, scheduled for release in 2023.

By Dr. Barclay Brown, ESEP - AI Systems Working Group Chair

AI Systems WG Webpage

Automotive Working Group

MBSE Tool Related Capstone Projects

- Spring 2022 semester of Capstone Projects with George Mason University completed
- Paper submitted for IS2023 in July 2023
- No Capstone students in Fall 2022 or Spring 2023 semesters
- Looking for additional universities and potential projects in 2023
- Potential opportunities with University of Arizona in 2023

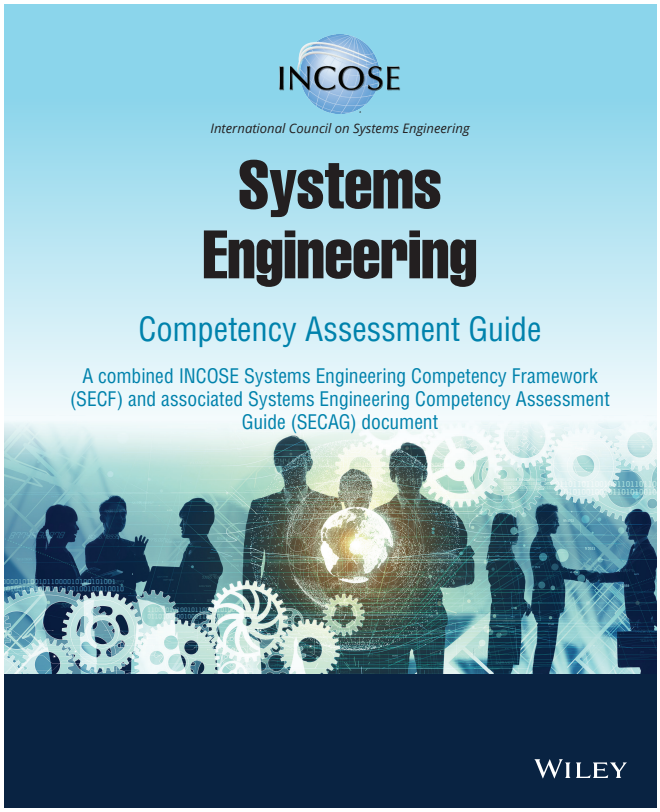
Application of SE, Safety, and Cyber Security

- This sub-group continued to make progress in 2022
- The sub-group has recently been focusing on a paper they submitted for IS2023, titled “Taming the Automotive Complexity Explosion”.
- Much of the work the sub-group has been doing focuses on vehicle, infrastructure, and societal impacts on Automotive Complexity. In addition to STPA and Control Loop Dynamics.
- The sub-group has also explored the Automotive Reference Architecture Model (ARAM) and the Risk Analysis & Assessment Modeling Language (RAAML), as well as mapping Automotive Standards, DevSecOps, and MBSE.
- In 2023, the sub-group is hoping to focus more on MBSE as a solution to complexity management.

By Gary Rushton - Automotive Working Group Co-Chair

Automotive WG Webpage

Competency Working Group



A compilation of 37 competencies needed for systems engineering, with information for individuals and organizations on how to identify and assess competence.

Purchase your copy from the Wiley Store

INCOSE Members get 25% off at www.incose.org/wiley

Systems Engineering Competency Assessment Guide represents 12 Years of Collaborative Work

For systems engineers in the United Kingdom, INCOSE's new Systems Engineering Competency Assessment Guide might look a bit familiar. That's because the working group decided to model its new guide on a 2010 INCOSE U.K. Chapter document.

"*It was clear that document was very U.K. specific, so adoption outside the U.K. was limited,*" said Ian Presland, one of the authors and editors of the new assessment guide. "*Having used the U.K. document, I knew it had its strengths but it also had its weaknesses. I volunteered to take a lead role in creating the new INCOSE Framework and Assessment Guide to ensure that positive features of the 2010 document were incorporated whilst its issues were addressed.*"

What first came out of his efforts and the efforts of many other INCOSE members across the globe – from Sweden to South Africa, America to Australia – was the Systems Engineering Competency Framework, self-published by INCOSE in 2018.

"*That was the first truly global systems engineering framework,*" Presland said.

But the group wasn't done.

"*As soon as we published the framework, we knew that we wanted to do the next part,*" said Lori Zipes, co-chair of the Competency Working Group and one of the editors of the assessment guide. "*Which is, 'We've told you what you need to do to be competent. How do you prove it?' That's what the guide is all about.*"

It was not a small task as there were 37 competencies at five different levels. "It was a huge effort," Zipes said. "We knew that it would be. We had a great team from the beginning."

Presland agreed. "*We gelled very well as a group, I think.*"

The third co-editor, Cliff Whitcomb, who is the chair of the Competency Working Group, took it one step further: He coordinated with INCOSE Publications to propose a book to John Wiley and Sons about publishing the guide. Wiley said yes.

"*I just naturally thought that taking an advantage of an opportunity to provide the framework and guide to a global audience that Wiley could provide in their constellation of possibilities with INCOSE in Systems Engineering made sense*," Whitcomb said.

"*I was blown away,*" Zipes said. "*That was very exciting for all of us. To think that this thing we were doing of our own volition because it was something good and important to do was going to be optioned by Wiley to be turned into a book. There is a certain aspect of that that is confirming about your work.*"

The fact that Wiley is publishing the guide means that it will be available to a broader, international audience – systems engineers and non-systems engineers, INCOSE members and non-members.

"*Any organization can use these competencies, knowledge, skills, and abilities to help develop their engineering workforce to broden the perception and the implementation of ways of approaching engineering so that you are looking at making things better for society and the environment,*" Whitcomb said. "*Taking a systems approach to it and looking at it holistically.*"

"*The information within it is extremely valuable. We've tried hard to make it agnostic to any particular domain,*" Presland said. "*We've tried to make it as flexible as we can.*"

We caught up with the Competency Working Group at IW 2023 to discuss the launch of the Systems Engineering Competency Assessment Guide.

Click here to watch the interview on YouTube.

The addition of the new guide means that members can adopt it and integrate it with other INCOSE products such as the Professional Development Portal, the certification program and the handbook, among others.

The editors want to be clear: This is not just a large reference book.

"*It's so much more than that!*" Presland said. "*It's really a 'one-stop shop' on competency, containing loads of practical advice, and several different application examples supplied by systems engineering experts across the globe.*"

By Beth E. Concepción

Competency WG Webpage

Lori Zipes Details Her INCOSE Journey

Lori Zipes Details Her INCOSE Journey

Lori Zipes serves as co-chair of the INCOSE Competency Working Group and also as Assistant Director for Technical Information in Technical Operations. With that pedigree, it might be surprising to learn that she came late to the Systems Engineering party – only joining INCOSE in 2006.

"*When I was growing up, I hadn't even heard of systems engineering," Zipes said. "Even in college*."

Zipes earned her B.S. and M.S. in Ocean Engineering at M.I.T.

"*I gravitated to ocean engineering, which is an unusual engineering discipline, but was very interesting to me,*" Zipes said. She was often the only woman in her classes.

"*When I reflect back on my choice to go with ocean engineering -- because that is a kind of engineering that crosses multiple disciplines -- I think there was something that I couldn't necessarily recognize or articulate at the time, that made me gravitate to ocean engineering because I have a systems mindset,*" she said. "*I just didn't know what to call it at the time.*"

Now she is the Command Chief Engineer at Naval Surface Warfare Crane, Indiana, and earned another M.S. degree – this one in Systems Engineering from the Naval Postgraduate School.

"*When I found this path, it really clicked for me and has been what I have chosen to make my life's work,*" Zipes said.

INCOSE Past President Eric Honour is the one who encouraged her to join INCOSE.

"*He said he felt it was a great organization, and advised that if systems engineering was my work, I should get involved.*" she said.

The nearest chapter was about 85 miles away from her, so getting involved at the chapter level wasn't feasible. Instead, she got involved with some of the INCOSE working groups, including Technical Standards.

"*That group immediately welcomed me with open arms,*" she said. "*I just immediately felt very valued, which was nice.*"

She also was part of a group that beta-tested an updated INCOSE certification exam, ultimately becoming the first person in Navy research and development to get any kind of INCOSE certification.

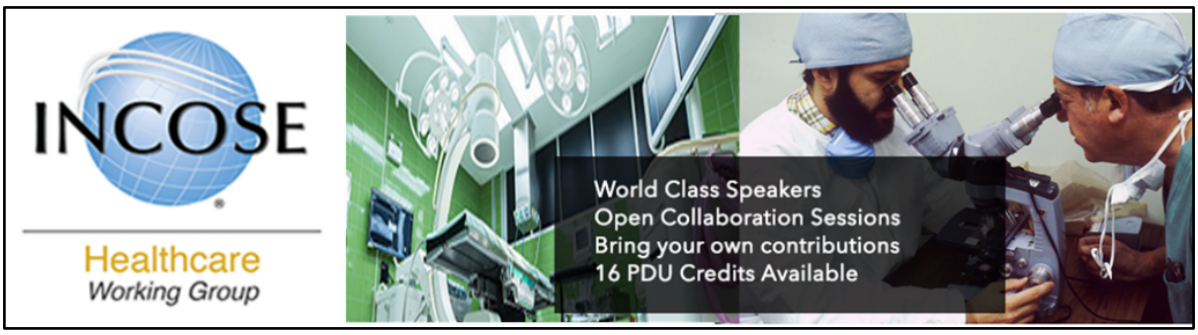
Zipes went to her first INCOSE International Workshop in 2011 where she saw camaraderie on display among INCOSE members.

"They were clearly friends and colleagues," she said. Samantha Brown was president at the time.

"A female president of a technical society. That got my attention as well. So that was when I really got hooked into INCOSE. From that moment on, I just started to do more and more things, mostly on my own time," Zipes said. "INCOSE has been worth every bit of energy that I put into it, because it's been wonderful for me both personally and professionally."

By Beth E. Concepción

Healthcare Working Group



8th Annual Systems Engineering in Healthcare Conference

April 26-27th, Minneapolis, MN

The INCOSE Conference on Systems Engineering in Healthcare enables participants to share the best practices in the latest Systems Engineering topics as applied to both Medical Devices and Healthcare Delivery. The theme for the conference is

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

Keynotes

The Keynotes will include 'Why is Systems Engineering Challenging for Medical Devices?' with Christopher Unger, Chief Systems Engineer at Ge Healthcare. The conference is looking into a keynote speaker from the FDA.

Audience

The audience is Systems Engineers, product developers and testers, Certifiers, and leaders of organizations developing complex healthcare products and services, from large Healthcare IT systems to medical devices to healthcare delivery organizations.

Conference Theme / Description

We seek practitioners to share their knowledge and experience through presentations and collaborative sessions. We encourage sessions on experience reports and case studies, Interactive panel sessions, and instructional tutorials.

Potential tracks include:

- Compliance/Safety/FMEAs
- Requirements and Test Mgt
- "Beyond the System"
- Digital SE (MBSE, Simulation)
- Agile & Lean Methods
- Machine Learning/AI

Location

The conference venue is Crowne Plaza Aire, 3 Appletree Square, Bloomington, MN 55425 near to the MSP airport and the Mall of America. A light breakfast, lunch, and snacks will be provided at the meeting facility each day and there is a banquet included on the first night.

Conference Hotel: A special conference rate is available before April 7th at INCOSE or call 877-666-3243 and ask for the "INC" rate.

Registration and Conference Information

Registration is open now, at: www.eventbrite.com/e/245682522037. Early registration ends March 30th.

Conference site: www.incose.org/hwg-conference. Contact christopher.unger@incose.net for more information.

See the draft conference agenda at www.incose.org/hwg-conference/program. Listen to prior attendees: https://youtu.be/8qtzjJHU_CU

Healthcare WG Webpage

Human Systems Integration

INCOSE HSI Worldwide Workshop 2022 - A Brieft Report

"Human Systems Integration (HSI) is an essential, transdisciplinary, sociotechnical, and management approach of systems engineering (SE) used to ensure that the system's technical, organizational, and human elements are appropriately addressed across the whole system lifecycle, service, or enterprise system. HSI considers systems in their operational context together with the necessary interactions between and among their human and technological elements to make them work in harmony and cost effectively, from concept to retirement." This is a definition that is anticipated for the next SE Handbook 5th edition.

We had 88 participants and 12 countries in the 2022 HSI Worldwide Workshop of INCOSE, held on November 16-18, 2022, in Torrance, California, USA, and hybrid. Three intense days of presentations and debates on various activities of the HSI Working Group (WG) that gathers representatives of academia, industry, and government agencies. HSI state of the art was provided together a persistent dimension, that is Human Machine Teaming (HMT), mixing SE and artificial intelligence (AI).

The "human" in HSI includes all individuals and groups interacting within the system of interest (SoI). Within HSI, these are typically referred to as "stakeholders." Stakeholders can include system customers, owners, users, operators, maintainers, trainers, support personnel and the public. While most people who interact within the SoI will be cooperative or have a vested interest in its performance, consideration may also need to be given to non-cooperative people or those with malign intent such as competitors, adversaries, criminals (physical and cyber), and those seeking to use the system outside of its design intent.

HSI adopts a sociotechnical system perspective that considers a system as a representation of natural and artificial individuals and organizations of humans and machines, where machines includes both hardware and software. Therefore, HSI considers that all systems include both humans and machines, and that to optimize the system all of these elements must be considered within SE activities.

HSI considers integration from two key viewpoints. The first is the effective integration of the human and technological components in a system, while the second is the efficient integration of the different perspectives of the human element within the system. An example of these different HSI perspectives can be seen in the HSI diagram (next slide). The specific perspectives relevant to a project will vary depending on the nature of the system and lifecycle organization's activities.

Grace Kennedy gave a presentation of what INCOSE HSI Primer will be, with its four volumes. Volume 1 will be released at the end of 2022, and we started to discuss and elicit various contributions for the making of volumes 2, 3 and 4. This exercise will continue during 2023, and we expect having the full Primer reading in the beginning of 2024.

Dimitri Masson, our HSI WG Webmaster, presented current activities regarding INCOSE HSI website. WE started discussions on how HSI website is currently being configured, content-wise and structure-wise. We also discussed the next HSI conferences and workshops. In addition, our partnership with the International Ergonomics Association (IEA) is going very well, with a great participation during the 2021 HSI conference and this 2022 worldwide workshop. We anticipated the possibility of postponing the next HSI conference to 2024 in Korea, in collaboration with 2024 IEA World Congress. Doing this, we also anticipated the organization of workshop activities during the year 2023 by organizing three events in three geographical zones: Europe, US, and Australasia. We also suggested that a stronger HSI participation should be developed in IW2024.

We typically discussed several contemporary topics, such as the development of HSI in various

kinds of ventures, model-based HSI, making system architectures HSI-centered, HSI in technical leadership with INCOSE TLI, training-centered design, human readiness levels and HSI-centered maturity assessment, human contribution to safety, HSI and social issues related to responsibility and justice, virtual reality in medical education, human-centered AI, and digital twins. Several HSI-centered Lab presentations were given by Sandia National Labs, the FlexTech chair of Paris Saclay University (CentraleSupélec) and ESTIA Institute of technology, University of Southern California, NASA Johnson Space Center, NASA Marshal Space Flight Center, Ariel University, and Air Force Institute of Technology. Three invited talks were given by Guy A. Boy (France) on HMT, So Young Kim (USA) on JPL HSI activities, and Gudela Grote (Switzerland) on going beyond sociotechnical systems toward organizational accountability.

Several topics emerged during this workshop, such as dealing with the unexpected, human-machine teaming considering the machine as a partner, autonomy of humans and machines, emergent activities, and jobs in our digital era, risk-taking and prevention in design and operations, as well as tangibility, flexibility, complexity, maturity, stability, and sustainability. It was accepted that contemporary HSI deals with physical, cognitive, and social issues and concepts to be seriously considered in SE and engineering design. In addition, the development of an HSI ontology was strongly identified and suggested. It was also generally accepted that HSI is not only a matter of user interfaces, involving usability for example, but also mostly about considering human and organizational factors very early during the design process and during the life cycle of a system. Sooner or later, HSI should encapsulated and supersede SE.

By Professor Guy André Boy, Ph.D. - INCOSE Fellow Chair, Human Systems Integration Working Group

HSI Integration WG Webpage

Requirements Working Group

RWG Success at IW2023!

The Requirements Working Group (RWG) held several activities leading up to, and at, the International Workshop this year! For the second year we held our pre-IW virtual event, enabling the members of the RWG to present ideas and share information during January 23 and 24. Topics ranged from "Standards and Regulations Compliance" to "Configuration Management of Variants Across the Digital Thread", and our members held interactive discussions to help advance the practice of needs and requirements across different industries and tools.

The link to the INCOSE RWG pre-IW2023 Sessions is on our INCOSE RWG YouTube Channel: IW2023 Sessions - YouTube.

During IW2023, RWG chair Tami Katz and co-chairs Lou Wheatcraft and Raymond Wolfgang attended the event in person, while co-chair Mike Ryan attended virtually.

The Requirements Working Group was happy to receive two INCOSE working group awards at IW2023!

We have received the Outreach Award for our efforts with our regular meetings, engagement with Chapters, presentations at events, and providing support to the systems engineering community with our INCOSE RWG YouTube channel.

We are also very honored to have received the Product of the Year Award, for the release of the Needs and Requirements Manual and associated guides. This was a multiple year effort involving many volunteers, and we thank all those who have contributed to the material, performed reviews and provided feedback to enable the release of these products in 2022.

Two afternoon sessions were held at IW2023, with a focus on the update to the Guide to Writing Requirements. The discussions were highly interactive, resulting in many helpful comments to support the updates of the guide. We appreciate the great participation of those that attended the sessions! The presentations for the pre-IW events and the sessions held at IW2023 are available at our RWG IW2023 iNet site.

Collaboration with Other Working Groups

During 2022 and at IW2023, the RWG also collaborated with several other WGs including the Systems of Systems WG, Systems Security Engineering WG, and SE Quality Management WG. This collaboration was very beneficial and impactful for all concerned. Showing the example outcome of collaborating with the SSE WG, we have captured the following takeaways, which will be expanded in future INCOSE products:

1. SSE is a critical area that all SEs must be aware and address, both customers and suppliers, no matter the type of system.
2. SSE is really about loss protection, prevention, and recovery.
3. SSE is a lot more than just IT and cybersecurity
4. While the cost and time to deal with loss may seem to be problematic, the cost of not doing so will be much more expensive in the long run.
5. SSE is closely linked to safety and resilience and are merging. Many losses have a direct safety consequence.
6. SSE applies across the lifecycle, not just during use.
7. SSE must be built in from the beginning, not just added on at the end as an afterthought.
8. In addition to the standard use cases and operational scenarios, mis-use cases, and loss scenarios must be addressed. What are the threats and what loss can users and customers not tolerate? The likelihood and impact of these losses are risks to the organization that must be addressed.

9. Lifecycle concepts concerning protection, prevention, and recovery must be defined and capabilities addressing these defined and included within the integrated set of needs against which the System of Interest (SOI) will be validated. The integrated set of needs and resulting requirements will not be complete unless the SSE needs and requirements are included. Key stakeholders must align on these needs.
10. Requirements to address these needs must be in the form of functional/performance requirements that the SOI can be verified against. These design input requirements address the capabilities needed to be provided by the system to prevent, protect, and recover from loss.

While these are written as they apply to SSE, a key insight is that the basic concepts apply to not only security, but safety, resilience, and the "-ilities". With this perspective, it is critical that we change how we viewed these in the past as non-functional, quality requirements that describe characteristics of a system, to recognizing that they are really addressed using functional requirements to provide the needed capabilities associated with each. These must not be treated as an afterthought or kicked down the road for others to deal with; they must be addressed at the beginning of the project. We can no longer be satisfied with requirements that say, "The system shall be secure according to [xxxxx]." "The system shall be safe according to [xxxxx]." Or "The system shall have a reliability of [xxxx]."

With this perspective, we identify loss scenarios and scenarios associated with each to clearly understand what the stakeholder expectations are, define lifecycle concepts for each, identify the capabilities the system must have to address each of these, include these capabilities in the integrated set of needs, and get stakeholder alinement and agreement on the resources, cost, and time needed to achieve these capabilities. Then each of the needs associated with the capabilities will be transformed into functional/performance requirements that will result in those capabilities. As stated by Nancy Leveson, at IW2023 *"To make progress, we need a paradigm change!"*

Updates to the Guide to Writing Requirements (GtWR)

We are working on version 4 of the GtWR! Please see the RWG iNet site for the draft GtWR version 4, along with the MS Excel comment form.

We request reviewers provide any comments using the form, with recommended wording changes/additions, to Mike (Michael.Ryan@incose.net) and Lou (Louis.Wheatcraft@incose.net). We are seeking comments by March 14, 2023. We expect to have one final draft for RWG review in early May in time to incorporate any comments so that GtWR version 4 can be submitted to Tech Ops for approval and release at IS2023.

RWG Activities during 2023

During 2023, in addition to updating the Guide to Writing Requirements, the RWG is also reviewing content of the SEBoK to provide suggested content updates for alignment with the Needs and Requirements Manual, continuing collaboration with other working groups to help generate domain specific guidance, and holding monthly meetings to keep the RWG Members informed and engaged. Please see our new external website for upcoming INCOSE RWG events! We also encourage INCOSE members to join our RWG Yammer Community, and provide questions and comments related to the topic of Needs and Requirements.

By Tami Katz, ESEP - Requirements Working Group Chair

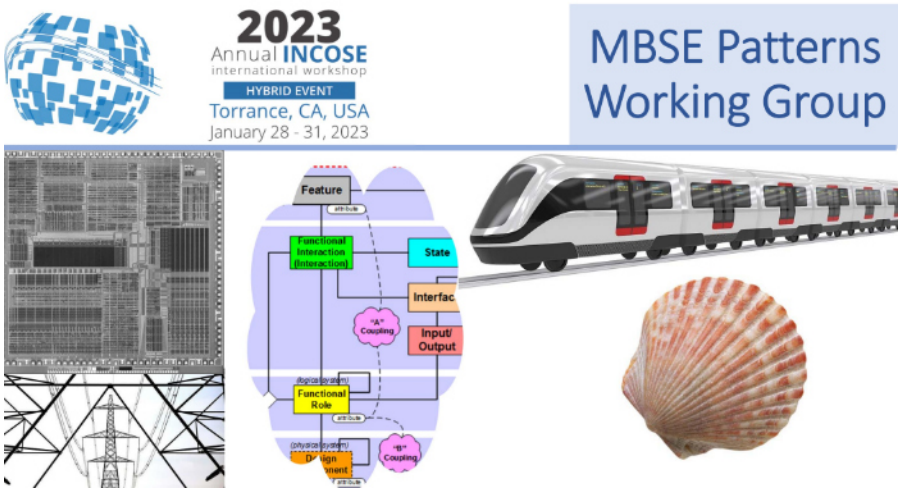
Requirements WG Webpage

MBSE Patterns Working Group

The MBSE Patterns Working Group met during IW2023 with 37 participants, of whom 22 were on site. This busy working group reviewed fourteen recent, current, and startup projects, three of which were also highlighted during the MBSE Workshop Round Robin: Patterns WG IW2023 Projects Summary

AIAA Publishes Digital Twin Reference Model, Based on INCOSE Innovation Ecosystem Pattern

The American Institute for Aeronautics and Astronautics has released its AIAA Digital Twin Reference Model and Case Studies publication. The Digital Twin reference model adopted for this aerospace industry-reviewed project is the INCOSE Innovation Ecosystem Pattern, which the Patterns Working Group has evolved from the INCOSE Agile SE Life Cycle Model Discovery project, performed jointly with the Agile SE Working Group. AIAA is also in the publication process for release of its parallel Digital Thread project, currently summarized in the AIAA Digital Thread Reference Model and Recommendations Report. These are both key aerospace industry references in which the INCOSE Patterns Working Group has played key collaborative roles for both the reference models and case studies.



Semantic Technologies for Systems Engineering (ST4SE) Project Releases Project Report

The MBSE Patterns Working Group reviewed the ST4SE Project Report published as part of the Semantic Technologies for Systems Engineering Project. This included illustrative demonstration of both automated generation of configured SysML MBSE Model from a generic SysML MBSE Pattern, and also automated conformance checking of a SysML MBSE Model for conformance to a generic SysML MBSE Pattern. Semantic Technologies include W3C standards-based languages and industry semantic automated reasoners.

Pattern-Based Support for INCOSE FuSE Foundations and Applications Workstreams

During IW2023, the Patterns WG provided support for Future of Systems Engineering (FuSE) sessions in both the Foundations and Applications workstreams. The working group continues to support the FuSE Foundations workstream, led by Prof. Oli de Weck, including applications of its contributions of Vision 2035 Theoretical Foundations. Contributions to the FuSE Applications workstream, led by Tom Strandberg, are being provided for the Innovation as Application effort, based on the Innovation Ecosystem Pattern from the Patterns Working Group.

By Bill Schindel - Patterns Working Group Chair & Troy Peterson - Co-Chair

MBSE Patterns WG Webpage

Natural Systems Working Group

New primer suggests looking at nature to help solve problems

Sometimes the solution to a problem is right in front of you – in nature, that is. That's the message the Natural Systems Working Group wants INCOSE members to take away through the new Natural Systems Primer.

"*Leveraging natural systems – looking at natural systems for inspiration -- can benefit every phase in the systems engineering lifecycle,*" said Dennis Tuckowski, the incoming chair of the Natural Systems Working Group.

It seems so simple, but it took a while for the primer to come together.

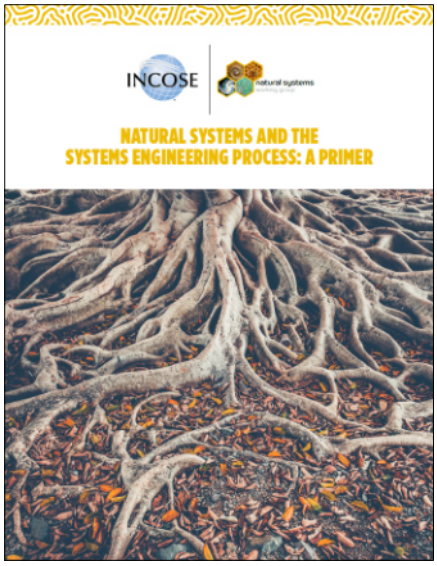
"*We started it as an alternative to a Systems Engineering Body of Knowledge (SEBoK) article [around 2014],*" said Curt McNamara, current chair of the Natural Systems Working Group. "*Then it gained momentum once the [Systems Engineering Handbook] page was approved and slated for publication.*"

"*There's so much to learn – mechanical or electrical or whatever -- you get really good at your niche," said George Studor, founder of the working group. "A lot of systems engineers have some bias because they've been through one channel or another. We're trained to think in compartments. Nobody thinks big like a child. [Natural Systems is] a childlike approach to understanding the world. We tend to think like adults with intelligence and information. We don't think, 'Ah, that's amazing.'*"

Tuckowski agreed. "*It's not ingrained in us to observe around us.*"

The co-authors said they hope that the primer will encourage people to take a look at how nature could help them.

"*How does nature solve problems, and how can systems engineers mimic them to enhance their work?" asked McNamara. "By studying Natural Systems, engineers can learn about optimal design, patterns, complexity, resilience, and sustainability.*"



Download your FREE copy at
www.incose.org/naturalsystemsprimer

There is also the benefit of it offering a good time.

"*[Approaching a problem from this new angle] excites employees. Designers are really curious people. If they consider this, it's going to be really cool and fun," McNamara said. "So there are benefits beyond the product improvement. It's going to make things better throughout any organization.*"

The INCOSE Natural Systems Primer is available to download free of charge from the Natural Systems Primer page of the INCOSE website or in INCOSE Online Store.

By Beth E. Concepción

Natural Systems WG Webpage

Quality Management Working Group (SEQM)

Learning to Produce Reliable Systems Quality - Values-Based Quality Management Educcation Offed by INCOSE SEQM Working Group

We've all experienced a lack of quality, in the products and services we buy for ourselves and our families and in our processes at work, no matter the industry. Supposedly reliable people and companies often fail to keep their promise to us as customers, while introducing chaos and wasting time and money in their own companies.

Companies struggle to hire engineers and other staff who will deliver a quality experience to their customers but are plagued by a highly disengaged workforce. Gallup polls report that over 70% of employees are disengaged, actively disengaged, or hate their jobs.

How can a quality-minded systems engineer make a difference?

The INCOSE Systems Engineering Quality Management (SEQM) working group (www.incose.org/seqm) has partnered with the Quality Management Institute (www.qualitymanagementinstitute.com) to offer QMI's extensive educational course and certification in QM to members of the working group with a full scholarship—there's no charge to INCOSE SEQM working group members, and new members are welcome to join and enroll in the course. You must be a full INCOSE member and join the SEQM Working Group.

The course is offered through a self-paced/cohort approach with course materials presented online and biweekly cohort discussion sessions with live instructors. Online coursework is approximately 24 hours in total, spread over the 16-week cohort schedule. The hour-long cohort sessions meet on Wednesday afternoons.

The next cohort starts on March 1, 2023, at 14:30 EST, 20:30 CET, and is open for enrollment until March 22, with future cohorts planned in 2023 and beyond.

See complete information at www.incose.org/seqm and contact barclay.brown@incose.net, with any questions, or to enroll.

By Dr. Barclay Brown, ESEP - SEQM Working Group Chair

SEQM WG Webpage

SySTEAM - Springing Into Spring 2023

"A Light exists in Spring/Not present on the Year/At any other period --/When March is scarcely here," mused Emily Dickinson in one of her poems.

Indeed, there's something inherently charming about the start of spring that makes it an excellent time to revamp and re-energize ahead of an exciting year ahead. SySTEAM has taken that philosophy to heart this year, using Quarter 1 as an opportunity to launch a few logistical and strategic updates.

New year, New Changes

SySTEAM's 2022 work focused primarily on brainstorming and idea development in support of its mission to "improve education for all students, everywhere" through the creation of a framework for integrating systems thinking/systems engineering concepts into classrooms of all levels. In 2023, the SySTEAM community is now seeking to build off of that pool of ideas and identify the community's consensus opinions on systems thinking/systems engineering education integration in order to develop a clearly codified set of definitions and recommendations that can be issued to stakeholders and other members of the general public with an interest in education & curricula. The most recent SySTEAM general body meeting (GBM), GBM #11, focused primarily on developing a consensus approach to defining and segmenting the educational pathway in a way that would allow for different levels of educational advancement to be consistently paired with expectations of different levels of mastery in systems competencies. Going forward, SySTEAM is planning on using the consensus opinions identified during its activities as a basis for developing formalized recommendation reports for broader review and subsequent publication.

Plannign Ahead

In support of its plans for 2023, SySTEAM has also made a number of changes to its meeting logistics:

1. *Bimonthly meeting schedule*: SySTEAM is officially switching to a new meeting cadence, with meetings held on a bimonthly basis (i.e., once every two months). The aim of this change is to make it easier for members to

SySTEAM Core Values

Accessibility & transparency	Inclusivity & accountability	Quality & action-driven performance	Integrity and ethical conduct
The SySTEAM community is publicly accessible, and all of our group's work products are released to the public, free of cost, upon completion.	We are an international community open to anyone, anywhere, interested in supporting our mission, and seek out diverse perspectives and stakeholder feedback on our work.	SySTEAM prioritizes the development of implementable, useful recommendations that are beneficial for educators and students alike.	Our community abides by ethical standards and seeks to ensure all of its efforts are viable, implementable, and positively impactful.

plan ahead for SySTEAM meetings, and to also minimize schedule conflicts with other INCOSE meetings and events on the academic calendar. SySTEAM's community meetings continue to be open to any and all interested individuals; you can register for the GBMs online (https://bit.ly/3B8Waf7), if you haven't done so already, and receive an email notification ahead of each meeting. **The next meeting is currently scheduled for Thursday, April 6th, 2023, from 10AM to 12PM Eastern Time.**

2. *Extended meetings*: SySTEAM is shifting to two-hour meetings (as opposed to the one-hour meetings from last year), allowing for SySTEAM's general body meetings (GBMs) to allot more time to working sessions and provide community members with better opportunities to engage in longer, more in-depth discussions. Participants with schedule conflicts are also welcome to drop in on meetings even if they are unable to stay for the entire time, or can otherwise participate asynchronously via SySTEAM's online community hub on Discord.

3. *Roundtable discussions*: Prior SySTEAM GBMs have made use of breakout rooms and small-group discussions as part of brainstorming efforts. In support of its focus on identifying consensus opinions from the whole SySTEAM community, this year's SySTEAM meetings are now shifting to whole-group/roundtable discussions, in order to provide more opportunity for back-and-forth debate among community members and more diverse discussions.

Upcoming mini-conference

SySTEAM is also excited to plan its first mini-conference, slated to be held later this year. While the logistics are still being ironed out, the conference is likely to be held in late June or September, with a call for abstracts and a call for peer reviewers going out sometime soon.

As mentioned in last quarter's newsletter article, the idea for the mini-conference is to provide members of the SySTEAM community and other interested individuals with the opportunity to showcase their projects, ideas, and efforts on SySTEAM-adjacent topics in a community of their peers, along with the opportunity for their abstracts to be shared with the broader public via a written SySTEAM report or publication documenting the proceedings. SySTEAM has an active interest in a wide range of topics adjacent to its mission of integrating systems thinking/systems engineering into education, and topics such as case studies in performing STEM outreach, new ideas for integrating interdisciplinary education into the classroom, ideas for improving industry training/education standards, etc.; the mini-conference will provide SySTEAM with the opportunity for community members to share and discuss conference-style content of anything similarly related to SySTEAM's mission, vision, and goals in a welcoming environment. Individuals potentially interested in attending and/or contributing to a SySTEAM mini-conference (even if they are not currently INCOSE/SySTEAM members) are encouraged to fill out the interest form available at the following Bitly link: bit.ly/3A3J5oa and to join the SySTEAM Discord (bit.ly/3oy1GmF) if they have not done so already. Notifications and instructions will be posted on the SySTEAM website, email listserv, and Discord community hub once a formal call for abstracts/peer reviewers is issued.

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!

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

SySTEAM Webpage

PM-SE Integration Working Group

The PM-SE Integration Working Group held multiple productive sessions during INCOSE IW 2023.

The Core Leadership team all attended in person in Torrance, CA, USA.

An open session was held in-person and virtually to encourage new participation and make IW attendees aware of PM-SE Integration WG mission and activities. The Co-Chairs presented on the WG recent events and WG initiatives. New members were welcomed, and volunteers joined WG initiatives.

Specific working sessions were held on the Academic Initiative, focused on the interactive PM-SE Serious Game, and on the Strategic Planning & Management Initiative. The initiatives were advanced and new volunteers added.

For more information, or to join the PM-SE Integration WG, please visit: incose.org/pmse

Left to right: John Lomax, Co-Chair; Jean-Francois Veron, Initiative Lead; Jean-Claude Roussel, Co-Chair; Molly Kovaka, Webmaster and IT Director; Dr. Tina P. Srivastava, Co-Chair; Mark Kaufman, INCOSE Representative to PMI.

PM-SE WG Webpage

Yammer Will Become Viva Engage

Microsoft has announced a change in the name of the product we now know as Yammer. Here's what's happening, in Microsoft's own words:

"Yammer has been powering community experiences in Microsoft for over a decade. In that time, we've seen our customers use Yammer to influence their company culture, bring employees together during times of trial, share knowledge and empower employees with a voice that positively influences change within their organizations. During this period, you've inspired us, you've shaped us, and you've grown with us. Six months ago, we took the first step to rebrand the Yammer Communities app for Teams to Viva Engage, to align Yammer more closely with our Viva suite of employee experiences. Since then, we've continued to add new functionality to both Viva Engage and the Yammer apps including storyline. Over the last several months we've heard your feedback that having two apps surfacing similar experiences and the same services and content has introduced confusion and made it challenging to drive adoption and create clarity for end users.

Over the next year, Yammer experiences will be rebranded to Viva Engage to better align with Microsoft Viva and become a key pillar of the Microsoft Employee Experience Platform. We are excited that this change will unify Viva Engage across web, mobile, Teams, Outlook and other experiences. This change is a direct result of the feedback we've heard from you, our customers, and it will help us deliver an integrated experience and a single Viva Engage platform across apps and endpoints—wherever you choose to engage."

As you know, INCOSE uses Yammer to connect members with each other and communities like Chapters and Working groups and we expect to continue to use it under the new name!

By Dr. Barclay Brown,ESEP - INCOSE Chief Information Officer

Mentor Matching Pilot

INCOSE launches pilot of new mentoring program

People who are early in their careers or new to the field of systems engineering have another reason to appreciate INCOSE: a new mentoring service. Launched as a pilot in January, the service features nearly two dozen initial mentor/mentee pairs (with more signing up) and will run through June with three opportunities for feedback.

Deputy Services Director and Team Lead Heidi Davidz, Ph.D., said, *"It's very valuable for professional development, particularly in systems engineering, for people to have mentors to help them navigate the content and the context in which they need to be able to execute."*

The mentoring service program offers a supplement to existing mentoring opportunities offered through the Technical Leadership Institute and on-the-spot mentoring offered at INCOSE symposia.

Davidz said the team will present the results of the pilot program at the INCOSE International Symposium in Hawaii in July with the goal of having the full program in place by the end of the calendar year. She also said she would love to see the program grow to 100 pairings.

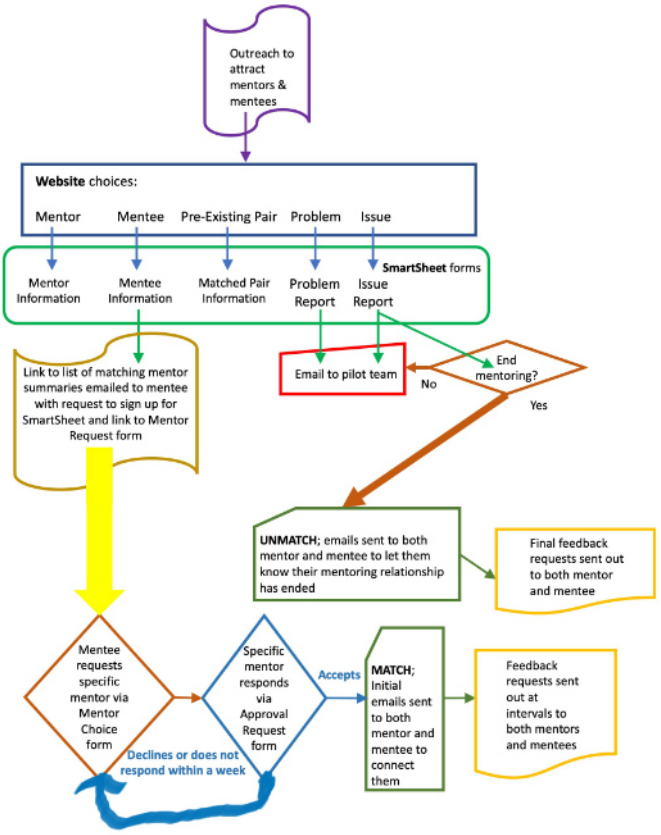
Implementation Lead Dorothy McKinney has been trying to get a program like this launched since 2004 because of the importance to growing membership.

"*The ability to get mentoring is potentially one of the things that would attract someone to become an INCOSE member*," she said. "*That's a powerful attractant.*"

But that's not the only reason the mentoring program is important.

"*Growing membership is one thing, but the most important thing is the passing on of knowledge and insight*," McKinney said. "*It's not like teaching, and it's not even coaching. Mentoring really is helping people understand what the important questions are that they need to answer for themselves rather than giving them the answers. The hardest part of being an effective systems engineer is knowing what to focus on, knowing what questions to ask, and what to be concerned about. You don't learn that by someone telling you.*"

Process Flow for this Mentor Matching Pilot Program



For more information or to sign up, visit www.incose.org/mentoring.

By Beth E. Concepción

Mentoring Webpage

Are You Practicing Real MBSE?

Start Implementing a Data-Driven Approach to Model-Based Systems Engineering.

Join the Digital Transformation. Download Your Real MBSE eBook to See How.

https://specinnovations.com/download-real-mbse/

An Update from EWLSE

Welcome to the EWLSE leadership team Newsletter. Here you will find reports from the EWLSE founder and each of three sectors. Enjoy!

Women leaders have been busy empowering systems engineering through various technical efforts as can be seen throughout INCOSE and beyond. At the time of this writing, we have already held successful 2023 events in Israel, United States (California), and Brazil.

All INCOSE members are welcome to join the Empowering Women Initiative (you can join by going to your INCOSE.org Profile > Join A Working Group > Empowering Women), and the Empowering Women Yammer community (web.yammer.com) to share your positive news and examples of empowered leaders in systems engineering. We would love to hear from you!

INCOSE IW 2023 Activities Report

Diversity, Equity and Inclusion (DEI) and EWLSE collaborated at the INCOSE IW Conference to hold a combined reception attended by several dozen members and advocates on Sunday January 29, 2023 at the Torrance Marriott in California. Many thanks to Eric Specking for leading the DEI/EWLSE reception. The attendees enjoyed great conversations and learned about what DEI and EWLSE initiatives and the excellent work being done in these areas.

During the conference, DEI and EWLSE held two working sessions. First, Maria Romero, Associate DEI Director for INCOSE, led the *Modeling Cognitive Diversity Across the System Lifecycle* working session. Please see the separate article *MBSE Model Views for Cognitive Diversity and Difference Between Cognitive and Neurodiversity* for more detail on that session. Following that session, Alice Squires, EWLSE Founder, led the *Emerging Trends in Systems Engineering Leadership* working session, which featured guiding information for all leaders and especially those in the technical domains, see "Want Innovation to Thrive? Create Open Welcoming Environments" for a high-level preview of the content. In this session, Maria Romero and representatives from nearly every chapter of Emerging Trends in Systems Engineering Leadership: Practical Research from Women Leaders gave presentations that reviewed content on systems engineering leadership in the context of essential skills (human skills/soft skills), diversity, equity, inclusion, systems thinking, ethics, utilitarianism, and technological trends. If you would like a repeat of this session at your event, we would be happy to oblige. Please send your request to selbook@incose.net.

Next, Anabel Fraga represented EWLSE at the IW2023 closing marketplace and exchanged ideas with the audience and colleagues. See photos below. Thank you Anabel!

EWLSE Asia Oceania, Stueti Gupta

In the Asia Oceania sector, Stueti Gupta has been instrumental in planning for International Women's Day (IWD).

March 8th is about celebrating women's social, cultural, economic, and political achievements worldwide. IWD has been celebrated for more than a century, with the first gathering taking place in 1911. This year's theme is "DigitALL: Innovation and Technology for Gender Equality". It is a day of celebration for the women and girls who are championing the advancement of transformative technology and digital education and the progress which has been made toward women's empowerment and gender equity. It will also critically reflect on the impact of the digital gender gap on widening economic and social inequalities to strive for greater momentum toward gender equality.

Additionally, they have the topic #EmbraceEquity for campaigns. It states that collectively we can get closer to a gender-equal world without stereotypes, bias, and discrimination. A world where everyone is valued and only together, we can forge women's equality. By supporting the theme for IWD2023, INCOSE shows that we are taking action to drive equity, celebrating women's achievements, and raising awareness about opportunities for all.

For IWD, INCOSE EWLSE hosted a virtual event across the 3 sectors. The event was open to all. There was an invited speaker from respective sectors and messages from INCOSE leaders. We also plan to host a virtual café. Come join us in celebrating the occasion and recognize areas where you can contribute. If you missed us in 2023, please consider 2024!

Stueti, with support from other EWSLE members, is available to offer the "I Am Remarkable" Google-based training event at one or more INCOSE related events in 2023, please send your requests to stueti.gupta@incose.net. Stueti continues to lead plans for EWLSE related activities to be held at AOSEC 2023 as part of EWLSE 2023 day immediately following the main conference days. Please stay tuned!

EWLSE EMEA, Anabel Fraga

In the Europe, Middle East, and Asia (EMEA) sector, under the leadership of Anabel Fraga, EWLSE and DEI are creating a network of women and men to promote a mentoring program in Europe for young women interested in Systems Engineering careers or that need support in their careers. This effort will be aligned with the Volunteering program of the Chapter of Spain and the INCOSE mentoring matching program (see incose.org/mentoring).
President of the INCOSE Spain Chapter Anabel Fraga, along with Elena Gallego, is promoting a Volunteering group in Spain for STEM activities jointly with academia. They are also creating a YouTube channel to integrate a network of contacts to stimulate communication through

social media with interested girls to follow systems engineers from differing domains such as aerospace, defense, healthcare, software, etc. to enhance their understanding of systems thinking, , systems integration, and other systems engineering methodologies in order to promote this interdisciplinary way of thinking to enhance current and future solutions. She is looking for volunteers to include their strategy and methodologies for promoting STEM activities on the channel; if you would like to participate, please get in touch with her! STEAM activities promoting Systems Engineering in Elementary and High Schools will start this year in Spain and start the International Women's Day, in some schools already contacted. In collaboration with the Technological Woman Association of Spain, finding pilot elementary schools for promoting STEAM initiatives and books

The EMEA WSEC 2023, chaired by representatives from Spain, South Africa, UK, France, Italy, Israel, and Germany, will be held in hybrid mode in Seville, Spain (https://www.incose.org/emeawsec2023). The theme of the conference is "Engineering a Sustainable World", inspired by the United Nations Sustainability Development Goals. The conference will feature sessions related to SE Vision 2035, FuSE, and will include a DEI / EWLSE and sustainability focused workshop co-chaired by Anabel Fraga and Stueti Gupta.

Additionally, INCOSE Chapter Spain is collaborating with SESGE (Spanish Society of General Systems) to create a summer school about Systems Engineering next May 2023 in Madrid, Spain.

EWLSE Americas, Dr. Alice Squires

In the EWLSE Americas sector, the EWLSE Leadership team is seeking a lead to replace Erika Palmer who is now Associate Tech Ops Director. Please send your statement of interest to ewlse-leaders@incose.net. In the meantime, many thanks go to Eric Specking for leading INCOSE IW 2023 EWLSE efforts to help make the DEI and EWLSE events a success.

Carina Carla Silva hosted a virtual session for Embraer in Brazil with two presentations. For the first presentation, EWLSE Founder Alice Squires presented Leadership in the New World on empowering women, emerging trends in systems engineering leadership, and strategies for developing four types of leadership. For the second presentation, Milena Mendes, an Embrace Women Associate as part of the Embraer Embrace Diversity initiative, presented on the Embraer Embrace Women Initiative. This presentation focused on advancing gender equality, and Milena focused specifically on the mentoring initiative. Attendees of the seminar had the opportunity to join the Embraer mentoring program.

In Closing

Many EWLSE members and leads are part of the INCOSE Technical Institute of Leadership (TLI) on the continuous journey to become the best version of themselves.
In addition to the activities already completed in 2023, we continue to prepare DEI and EWLSE related events to take place during the EMEA WSEC 2023, INCOSE IS 2023, AOSEC 2023 with EWLSE 2023, and WE 2023. Stay tuned for announcements on these activities including through social media.

EWLSE is proudly supported by:

Caltech | Center for Technology & Management Education

SPEC INNOVATIONS

EWLSE Webpage

INCOSE Foundation

The INCOSE Foundation Board of Directors met during IW with several important actions taken: the election of a new board member – Ty Theriot, DAU Chair of the Department of Engineering who has been working with us through the DAU Rotation program mandated by the US Congress. Ty brings the board to 11 members. (All board members are noted at the end of this article.)

Each board member brings something unique and each is dedicated to the SE Global Member Project, which had a proper debut at IW2023; with the introduction of Dean Ayub Gitau who leads the Engineering Department at the University of Nairobi. Ayub joined us in person; Dr. Mary Akinyemi, Deputy Director International Relations Partnerships and Prospects; Editor, International Journal of Mathematical Analysis and Optimization: Theory and Applications (IJMSO) participated virtually with colleagues from the University of Lagos. The Foundation has now signed MOUs with each University.

Our immediate goal is to establish these two relationships, bring INCOSE resources to them, and encourage the development of a chapter in that vast region. Suja Joseph-Malherbe, Foundation board member from South Africa and former chapter president, in particular, will be a close ally in this process.

It has been a two-year process to reach this point; the first year spent honing the objectives and goals of this project, working closely with INCOSE leadership. With gratitude, we are so pleased to have hearty support from Marilee Wheaton and Ralf Hartmann about the work we are doing.

The second critical action The INCOSE Foundation took at its board meeting was to authorize the expansion of the SE Global Member Project. This will allow us to pursue channels to engage up to 200 members in the second phase. We'll report as we develop plans and reach out within INCOSE.

Business concluded, the Board prepared to greet guests at the Wine Soiree. What a pleasure it was to see so many people after three years! Well over 200 people gathered and enjoyed the wines and hors d'oeuvres filling tables. The CAB has been our sponsor for Wine Soiree every year since we began, for which we send oceans of thanks.

This is our only fundraising event during the year. It is a social event and we know how hard it is to pause those engrossing conversations and listen to speeches so we deliberately kept that part of our program to as short a presentation as possible. We had a chance to thank the CAB, display the passion we have for the SE Global Member Project, introduce Ayub Gitau, and draw the lucky winner of our raffle. You must all know by now that the winning ticket Ayub drew was Marilee Wheaton's who then generously donated her winnings to The Foundation!

Our project inspired other donations and expressions of interest. Many thanks to Marilee

for another generous donation of her portion of proceeds from the sales of her book 'Emerging Trends in Systems Engineering Leadership'.

Another very generous donation came from Dr. Tina P. Srivastava. Tina, the recipient of the David Wright INCOSE Leadership Award bestowed by The Foundation in 2013, has led a distinguished career since. This donation is based on the success of her recent book INNOVATING IN A SECRET WORLD The Future of National Security and Global Leadership in which she "examines America's legal and administrative framework for defense technology innovation and asks if it can take advantage of the open innovation model, and especially if it could be used by the U.S. government to manage delivery of innovative technologies in a system that prizes secrecy and delivery of low-cost hardware".

IW2023 was roundly attended. Please see the next issue of this Newsletter for information on precisely how much was raised through Soiree. We are grateful to everyone who supports what we are doing to bring INCOSE Systems Engineering resources to a global stage, especially to those whose geography does not allow them to afford the privilege of INCOSE membership.

The INCOSE Foundation Board – 2023

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Jon Wade, Director of Convergent Systems Engineering UC, San Diego

Holly Witte, Managing Director; Manager, INCOSE Publication Office

By Holly Witte - INCOSE Foundation Managing Director

Foundation Webpage

INCOSE Services Update

INCOSE services – what are they? The Services section of INCOSE is a relatively new development and the concept is still developing. The purpose of this short article is to give a summary of the services directorate of INCOSE, and to describe two of our newer services to you.

A dictionary definition of service is "An act of helpful activity". Within INCOSE, service refers to an activity or set of actions which supports the systems engineering community with professional development, recognition, networking, and/or engagement with systems engineering material. INCOSE exists to provide value to its members, the range of services from the services directorate are an impactful way to provide value to the members / stakeholders of INCOSE. The services are valuable when it is easy for INCOSE to provide and members to use, for example, to get in contact with other INCOSE members, or to be better informed on the latest advances in Systems Engineering .

The three main elements of Services, each with an Associate Director, are Events, Certification and Education & Training.
NCOSE (the predecessor of INCOSE when it wasn't International but was US only) was founded at an Event – we now have two major annual international events organised by Services – the International Symposium and the International Workshop. There are of course many other INCOSE events – Sector and Regional conferences, Chapter and Working Group events which are organised outside of Services. In addition to the main work of the Associate Director of Events, there is an Assistant director of the events portfolio, which tries to encourage a balance range of local events, and helping make all INCOSE aware of them.

The Certification service is also long established (>15 years). Certification is a formal process whereby a community of knowledgeable, experienced, and skilled representatives of an organization, such as INCOSE, provides confirmation of an individual's competency (demonstrated knowledge, education, and experience) in a specified profession. INCOSE offers three levels of certification, and as of November 2022 there were 1,398 ASEPs, 2,371 CSEPs and 363 ESEPs. This is about of a third of the INCOSE individual members with some form of certification.

Education and Training is more recently established, and its major product, the Professional Development Portal (or PDP) was launched in September 2022. The PDP is a comprehensive solution for Systems Engineers and other professionals who want to enhance their systems engineering knowledge and skills. It acts as a portal to Systems Engineering information that will help an individual develop in whatever aspect of Systems engineering (a specific competency, process area or topic) that they want.

One way of looking at the Services part of INCOSE is that it integrates the activities and outputs of the other parts of INCOSE and makes them accessible to the INCOSE members. So, Events are a means of communicating, sharing and debating the latest developments in Systems Engineering, Certification recognises professional development, and uses the experience from more senior members to confirm members status as a Systems Engineer. E&T, through the PDP, really exemplifies the integration that Services provide as much of the PDP content is the existing INCOSE publications and output (note much more content

form the huge number of INCOSE International Symposium papers are the next batch of material to be classified.

However, the point of having a Services Directorate in INCOSE is to look for new and different ways to provide value to the INCOSE members, and there I'd like to explain two areas that have developed in the past couple of years.

Firstly, to assist with individuals wanting help with their professional and career development, we are developing a new mentoring service. It is in a 6-month pilot at the moment, and we hope to have a full service released by the end of 2023. The mentoring service is one where INCOSE members can request a mentor or volunteer to be a mentor – and the service matches mentors and mentees and will offer help to ensure the "relationship" is productive. See www.incose.org/mentoring for details and how to register either as a mentee or a mentor. We are especially looking for more mentors to help deliver this new service. We believe this is a way of capitalizing on the diverse membership of INCOSE, and especially for those in a small company, or one without many Systems Engineers they can get guidance from another Systems Engineer with a different perspective and experience.

Secondly, there is Virtual Community, which has a range of offerings. This is a service that originated during the Covid pandemic, where there were no face-to-face meetings. Obviously since the start of Covid we have all got used to virtual meetings, and there are many organised by chapters, Working Groups etc. in INCOSE which are available to many more now they are on-line or hybrid. However, we felt it important to provide some "central INCOSE" offerings as part the portfolio. Currently we have two types of offering – webinars (which have been brought into services – they have been running for many years), and the Systems Exchange cafés. The webinars are a "traditional" forum for an interesting technical presentation (about 45 Minutes) and then some brief text questions and verbal answers. The cafés are designed to be the opposite – a very informal gathering where a group of people come together to talk about a topic of their own choosing (normally chosen by the attendees at a previous meeting, so there can be preparation / pre-reading if attendees want), but the conversation goes wherever the group wants. These meetings attract a diverse and international attendance, so are a good place to get an informal insight into different people's views and experience of Systems Engineering. There are three regular cafés (see Systems Exchange Cafes), each at a different fixed time zone, designed so that most people have at least two cafés available during their normal waking hours. They are very informal and welcoming – drop in and listen to, or even better contribute to, the conversation.

INCOSE VIRTUAL COMMUNITY

We are excited to be developing a third strand in the Virtual Community, and will shortly be adding the "Spotlight series" – which will be an extended (virtual) explanation / discussion / debate about a current topic in the INCOSE world (such as a new product, a lively or contentious topic, and emerging issue). Each Spotlight will be a "multi-media" extended conversation for an extended period. Exact length will vary, and depend on the specifics of the topic and the arrangements). The topic under the Spotlight will be announced on a webpage, with links to relevant reading material. Further introduction will be made in a webinar lecture (or series if needed), and the recordings of these will also be made available on the webpage. This will be followed with a (hopefully) lively debate via the INCOSE Yammer stream (a specific thread will be set up for each Spotlight). It is intended this will allow more debate, "to and fro" and range of contributions that the abbreviated questions at a webinar, or even a live conference presentation. So very much it is a continued conversation – and it is certainly my experience that Systems Engineers do enjoy a conversation about Systems Engineering. The Spotlight will end

with some virtual panel sessions where questions and issues arising from the previous month's discussion can be raised. We hope this will give people a chance for a more considered debate, after they have had time to read, digest and thing about the material presented at the start of the Spotlight.

It is an exciting time to be in the Services area of INCOSE – lots of change, lots of new services. The Services aim to offer value to our members – please give us feedback about each service (both praise and "better if.."), and any suggestions for new services or developments of the existing ones. The purpose is to try and bring the INCOSE understanding of Systems Engineering provided by its members, and the members themselves together so the practice of Systems Engineering can be developed and shared, to help INCOSE achieve its vision of "A better world through a systems approach". I hope you do find the Services we offer valuable.

By Richard Beasley, ESEP - Services Director & Berber Vogt

Spotlight on Berber Vogt

Berber Vogt is taking on more leadership roles in INCOSE, recently signing on as Assistant Director for Services, focusing on community building.

She joined INCOSE in 2014 as Director of Communications for the Dutch Chapter, then served as Associate Director of Communications. Her day job is Coordinating Advisor IA at Rijkswaterstaat, where she has been employed for nearly seven years.

Vogt started her career as a software engineer for Wilee Techniek.

"*I always had a systems mindset,*" she said. "*From young, I was already programming the computers – the old computers. I knew I would go in that direction.*"

She moved into systems engineering through work, primarily when she became a Project Engineer for Siemens.

"*A human being is like a system,*" she said. "*I don't have to think differently to do systems engineering.*"

Vogt joined INCOSE shortly after joining Siemens and said she finds the organization useful in many ways.

"*It helps me to recognize my issues. The issues I have, they have as well,*" she said. "*I can use the products already made. The conversations change because my mind is changing.*"

Vogt said she likes the camaraderie among members, which is why she wanted to join the Services team to foster more interactions.

"*Everyone is really kind to each other and helpful, which gives you confidence in the things you do,*" she said. "*I have to all the time choose what I want to do. It's too much. But it's good because it all belongs to each other.*"

Vogt also said the focus on FuSE is helping her in her current position in terms of knowing what conversations to have with colleagues and what aspects to focus on in training.

"*It helps me to make clear where I fit in and what I want to do,*" she said.

By Beth Beth E. Concepción

Introducing *Calling All Systems*

CALLING ALL SYSTEMS

A panel discussion hosted by INCOSE, bringing thought leaders from around the globe.

Series Sponsor DASSAULT SYSTEMES

'Calling All Systems' is a virtual platform of awareness about systems engineering hosted by INCOSE leaders through a series of panel discussions bringing thought leaders together from around the globe.

Calling All Systems premiered March 21, 2023. INCOSE will present and host a virtual platform of discussions through a series of nine programs focusing on key issues and subject matters that impact the system's engineering industry. Each panel session will be hosted by INCOSE as we bring together industry leaders and experts from around the globe.

Each session will be one hour with a live interactive question and answer segment. Sessions will be recorded to accommodate today's busy schedules.

The current series is sponsored by Dassault Systèmes who is aligning their values of support through investment dollars to provide a virtual platform to bring thought leaders together to discuss real issues throughout the industry.

Siemens is leading the program as our inaugural session sponsor, The Future of MBSE. As INCOSE leaders are hosting the sessions other thought leaders are invited to participate.

These sessions are discussions and not product placement. INCOSE sells ads for product placement. Sponsorship expresses value alignment. All sponsors are aware that these thought leaders panel sessions are not a platform to promote their products, but a panel to discuss key topics and the issues faced by the Systems Engineering community.

INCOSE is delighted to announce Dassault Systèmes has agreed to be the first 2023 'Calling All Systems' series sponsor, and Siemens has agreed to sponsor the first session sponsor.

By Honor Lind, Director for Marketing and Communications

Calling All Systems Webpage

The Inaugural Calling All Systems – The Future of MBSE took place on Tuesday 21 March 2023

475 attendees from 31 countries logged in to see the first thought leader panel of Calling All Systems: The Future of MBSE which was sponsored by SIEMENS.

There was a lively discussion, chaired by INCOSE CIO Dr. Barclay Brown, between the panelist.

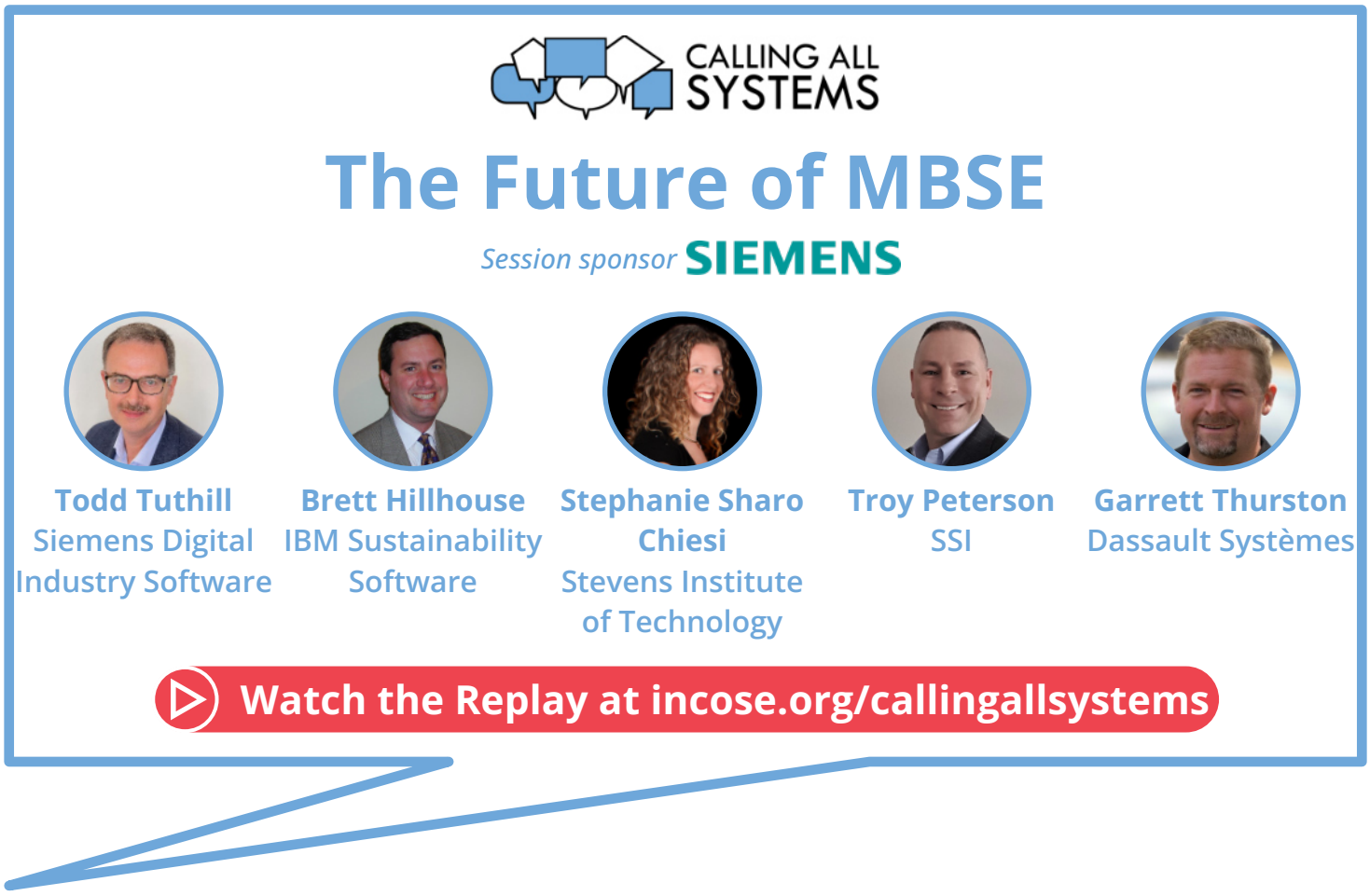
The attendees were a key part of the discussion with over 20 questions being posed, some of which were complex, along with useful links to relevant material being shared in the chat.

Since the meeting, the panelists have collective decided to look at these questions, some of which they did not have time to debate during the session and the information shared in the chat and have collated a report which INCOSE will publish in due course.

Honor Lind the Marketing and Communications Director of INCOSE and creator of 'Calling All Systems' would like to thank the panelists, attendees and sponsor for making the Inaugural Calling All Systems session such a success.

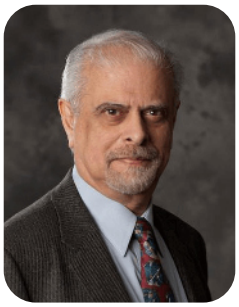
The MARCOM team is now working with our series sponsor Dassault Systèmes and Big Lever the session sponsor for the next 'Calling All Systems' which will focus on PLE and will take place in May 2023. More information will be released shortly.

If you missed the session, you can watch the video on the INCOSE Vimeo Channel.



MEMBER SPOTLIGHT

Azad M. Madni, Ph.D., receives NAE's Bernard M. Gordon Prize and IEEE's Simon Ramo Medal



2023 is shaping up to be a milestone year for Professor Azad M. Madni.

In January, he received the National Academy of Engineering's Bernard M. Gordon Prize for Innovation in Engineering and Technology Education. In May, he will receive the Institute of Electrical and Electronics Engineers' Simon Ramo Medal, which recognizes exceptional achievement in systems engineering.

"*The NAE Gordon Prize is the ultimate honor for engineering education,*" said Madni. "*I cherish this prize and am thrilled and humbled to be the 2023 recipient.*" The prize includes a $500,000 award, with half of the amount going to the University of Southern California, where Madni is a professor, to further mature the technology for which he received the prize. Madni is giving his half of the prize back to NAE to set up an endowed fund in his and his wife's name to pursue advances in transdisciplinary systems engineering.

Madni considers the Simon Ramo Medal the crowning achievement of his career as a systems engineer. Ramo, who was an honorary professor at USC, mentored many professors and students in the engineering department. Madni sees Ramo as a quintessential systems engineer who took a systems approach to both engineering and business, crediting him with learning how to successfully employ this practice throughout his career.


USC University of Southern California

USC Viterbi School of Engineering

Azad Madni Receives the Prestigious IEEE Simon Ramo Medal

Rachel Levin | January 5, 2023

Madni is being honored for pioneering contributions to model-based systems engineering, education, and industrial impact using interdisciplinary approaches

Madni is a fellow of 10 professional science and engineering societies, including INCOSE. He was elected to the National Engineering Academy in 2021 and has won a collection of outstanding awards throughout his career. He won INCOSE's Pioneer Award in 2011, and in 2021, he won INCOSE's Benefactor Award. Madni received his B.S., M.S., and Ph.D. in engineering from UCLA and is now a professor and the Northrop Grumman Foundation Fred O'Green Chair in Engineering at USC.

"*There is no greater calling than being an educator, so the youth in our country get a fair shot at the American dream,*" said Madni. "*It is said that a good education can change anyone, but a good teacher can change everything.*"

By Allison Brooks

The University of Southeastern Norway

The University of Southeastern Norway (USN) with NORSEC conducted their annual spring Systems Engineering Study Group (SESG) on February 15, 2023, on the topic: Reflecting on Systems Engineering in Practice.

For this SESG, several USN alumni were invited, and challenged to look back at their master project from the perspective of their current position. The two invited industry speakers were Tone Lohndal Hogstad (2010), KDA, and Frode Island Bergan (2013), Semcon. A lively discussion followed after the speakers with participants (including practitioners, professors, current cohort Master's and PhD students) offering reflections as well as ask questions to the group about how to handle different challenges. After a short break the 35 engineers in attendance broke out into small groups to reflect on two questions:

1. What do you still use from your formal education in your practice?

2. What one learning objective would you share with students of systems engineering?

The next USN / NORSEC event is the annual Kongsberg Systems Engineering Event (KSEE) that takes place June 14th on the theme "The difficult relationship between software (and data) and systems."

SESG is also conducted in the autumn. USN Systems Engineering is initiating a pilot to improve the reach of lifelong learning opportunities.

Digital Engineering Body of Knowledge (DEBoK)

DEBoK
Digital Engineering Body of Knowledge

Have you heard about the Digital Engineering Body of Knowledge (DEBoK)

With the DEBoK, you no longer have to wade through the entire internet to find relevant and credible Digital Engineering resources. The DEBoK team is focused on providing accurate and up to date content so you can get to work solving engineering problems rather than wasting your day to find a "needle in a haystack".

The DEBoK currently contains knowledge captured in the following areas: Contract Language, Policy and guidance, Strategy, DE Ecosystems, Training, and includes an extensive glossary of terms and definitions.

The DEBoK is a US Department of Defense (DoD) sponsored project that is being developed to support and accelerate Digital Engineering transformation by sharing of knowledge from across the globe and all industries. The very essence of going digital is to share and to be more collaborative. With tight resources, we need to be leveraging from each other's experiences.

Let the DEBoK be your Authoritative Source of Truth for Digital Engineering Knowledge and join the digital engineering community to build upon a base of knowledge.

Questions, want to participate? Contact:
osd.mc-alex.ousd-r-e.mbx.deboksupport@mail.mil

Access the DEBoK at https://de-bok.org

Latest Product Releases

Editor's Choice

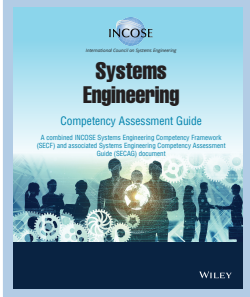
Systems Engineering Journal Volume 26, Issue 1

Read it here:
https://bit.ly/3abMeYW

The Editors of Systems Engineering are pleased to announce our Editor's Choice paper: 'Towards Developing Metrics to Evaluate Digital Engineering' by Kaitlin Henderson, Tom McDermott, Eileen Van Aken, Alejandro Salado

This paper presents a measurement framework for selecting and developing appropriate metrics to assess the value and benefits of model-based systems engineering (MBSE) and subsequently digital Engineering (DE). The authors believe a concerted effort across the industry to focus on measuring these variables is the most effective way to establish proof of the value of MBSE and DE. This open access paper is a must read for anyone interesting in MBSE and digital engineering. **Click here to read it.**

The January 2023 issue of Systems Engineering also includes papers on topics of quantitative validation of complex system integration principles, integration of systems design and risk management through model-based methods, combining dimensional analysis with MBSE, and much more.



Competency Assessment Guide

Download your copy at www.incose.org/competencyguide

This book provides guidance on how to evaluate proficiency in the competencies defined in the systems engineering competency framework and how to differentiate between proficiency at each of the five levels of proficiency defined within that document. Readers will learn how to create a benchmark standard for each level of proficiency within each competence area, define a set of standardized terminology for competency indicators to promote like-for-like comparison, and provide typical non-domain-specific indicators of evidence which may be used to confirm experience in each competency area.

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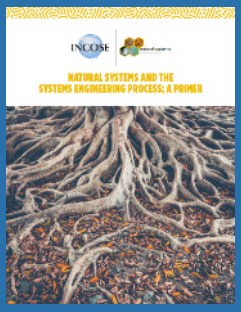
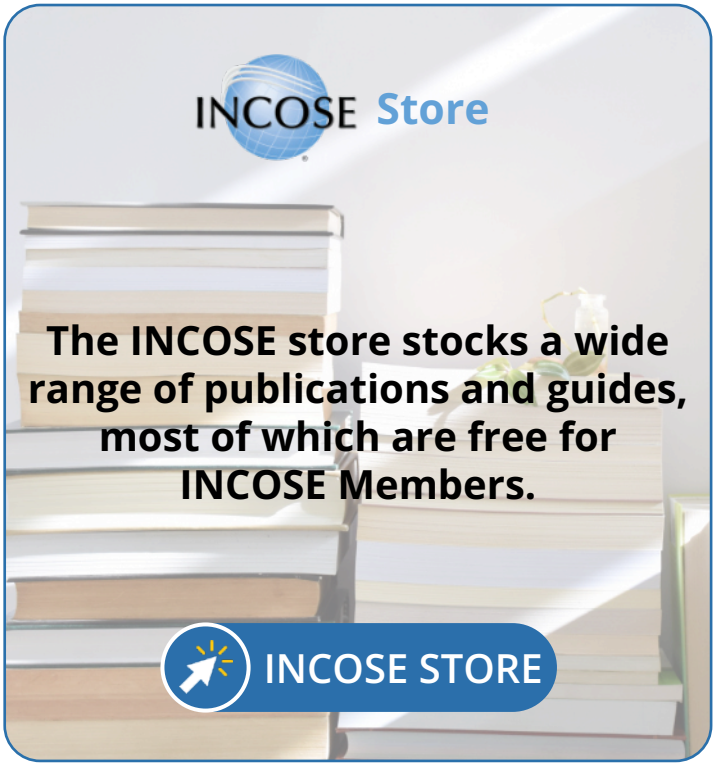
Latest Product Releases



Natural Systems Primer

Download your copy at www.incose.org/naturalsystemsprimer

Nature provides a wealth of solutions that can inspire engineers to create better designs. The Primer on Natural Systems is developed as a tool for Systems Engineering professionals and Project Managers to introduce and integrate Natural Systems thinking and approaches into their processes and products.



INSIGHT Volume 25, Issue 4

Read it here: https://bit.ly/3MAbU0d

We are pleased to announce the Volume 25, Issue 4 of INSIGHT published cooperatively with John Wiley & Sons as the systems engineering practitioners' magazine.

The issue theme is the Archimedes Initiative, a global systems engineering research network, to conduct applied research to evolve systems engineering and architecting principles, practices, methods, and methodologies for practicing engineers and scientists to address the complexity, dynamic behavior, evolution, and the underlying uncertainty in modern systems and system of systems.

Archimedes is within the scope of the global systems community addressing the challenges we face as expressed in the Systems Engineering Vision 2035.

The entire issue of INSIGHT Volume 25, No. 4 is available for viewing in the INCOSE Connect Library INSIGHT Practitioners Magazine, and on the FuSE landing page (www.incose/org/FuSE) Members accessing the Wiley Online Library should first login to www.incose.org and then link to the Wiley Online Library.

IP and Copyright - Or, What's On Your Refrigerator

Recent meetings at IW regarding INCOSE products have prompted me to offer this explanation of Intellectual Property (IP) and Copyright and a description of how these terms affect contributors to INCOSE products.

Intellectual Property is just what it sounds like – something created by using one's intellect – art, songs, novels, dance, research articles – whatever it is. That creation is the property of the intellect that created it.

All that artwork on your refrigerator made by your 4-year-old child or grandchild in preschool? That child owns the IP!

Suppose you decide all the art would be a fabulous family gift so you, the capable adult, take it to your local print shop and have it bound into a book to send to every family member you can think of, especially the grandparents. Now you are a publisher and you own the copyright to that bound book.

This is the original meaning of the word – the right to copy an intellectual creation of property. It is true that the intent has always been to sell those copies – parents, think of the possibilities – but the principle is in place regardless of whether money changes hands.

What about each individual masterpiece drawing your 4-year-old made? The child may freely distribute each picture since the parents' copyright applies only to the bound book. If the parents are truly savvy, they have asked for a CTA - copyright transfer agreement, in which case each individual submission may only be used with permission from and proper attribution to the publisher.

Can we make the leap to INCOSE products? Why, yes, we can.

Suppose members – let's call them Anna and Alan – are each asked to contribute something to an INCOSE product. They each employ their significant intellectual capacity to write an article or chapter. In other words, they create IP. They submit that created work to the Editor who deems it appropriate for the INCOSE product and, when every invited contributor has completed the assignment, each is submitted and the collection forms a whole, a new product.

The publisher – INCOSE or some other entity - owns the copyright to that new product and has likely gotten a CTA for each individual contribution. Anna, Alan and every other contributor still own the IP to their work. In the case of the SE Journal, they are free to use their submitted work **as it was at the point it was submitted** in any way they wish. In the case of the INCOSE books, Anna and Alan may also use their own created work as long as it is rewritten so it is not the same as it appears in the book. Since they are likely subject matter experts, they have probably written different versions of that material already and this will not be a burden. They (or anyone) may also request permission from the publisher to use the content as it appears in the published work.

There are subtleties, of course, and contracts with publishers govern some of those but not to take away an author's rights; rather, to provide the widest possible distribution. One other thing about copyright: the assumption is that the work you submitted is yours and that if you cite, quote or otherwise use something of someone else, permission has been obtained. The publisher binding all the work into a copyrighted product assumes the risk of any challenge, giving protection to the author who would have to prove the permission was granted, should it come to that, which could be costly.

So send that fascinating article or chapter you own on complexity or MBSE to your grandparents; or, if you are one, maybe to your grandchild who can probably already understand it.

By Holly Witte, INCOSE Publications Officer

Upcoming International Events and Event Site Selection

A record 702 people, in-person and virtual, attended the International Workshop (IW) this year in Torrance, CA. Recognizing that many working groups have successfully adopted a virtual meeting rhythm, this year's IW highlighted cross-working group collaboration.

To seed these efforts, IW 2023 featured sessions on the Future of Systems Engineering (FuSE) as well as traditional cross-cutting MBSE sessions. It was invigorating to see all the people gathered to advance systems engineering and the future of systems engineering. We look forward to similar cross-cutting sessions at future events including IW 2024 (January 27-30, 2024 once again in Torrance, CA USA) and IW 2025 (in Seville, Spain.)

If the number of submissions is any indication of the interest, this year's International Symposium (IS) held July 15-20 in Honolulu, HI will be well attended. We received a record number of submissions, over one hundred more than IS 2022. With the number of submissions, the quality of the accepted papers is higher than before, and we were not able to accommodate all of the good submissions in this year's program. If your submission was selected, please pay attention to the due dates that were communicated. IS 2024 venue site negotiation is underway.

The next six months is a very busy time for the Events Committee. In parallel with final preparations for IS 2023 in Honolulu and venue negotiation for IS 2024 (watch for an announcement on the European venue selected), we must now begin the site selection process for IS 2025. For INCOSE to secure the venues we want, the Events Committee must finalize our venue selection at least 24 months before the event (this is when venues set their larger events). This requires that we begin thinking about the venue selection at least 30 months (2.5 years) before the event. So at IW 2023, the Events Committee met to consider possible locations for IS 2025. We started by setting the sector based on a rotating schedule – for IS 2025 we are looking at Sector 1. We then look across the sector and identify locations that we would like to consider. During this meeting our professional conference organizer KMD shares their insights and expertise on possible locations – potential locations they know that weren't suggested, other considerations we may not be thinking about (e.g., ease of travel to location), etc. We left IW 2023 with a list of possible locations, but that is only the beginning of the process. KMD will next complete an initial review of the proposed locations for venues that might support our requirements. Over the next quarter, the Events Committee will review the information gathered by KMD and select three to five locations to pursue.

After the Events Committee performs a down-select on the identified locations, KMD will issue our formal request for proposals (RFP). The resulting data allows the Events Committee to select the top two or three venues to continue in the process. As a final step before making a recommendation, KMD will perform a site visit to ensure the "fit" of the venue for INCOSE – feel of the venue, availability of hotels, cost of being at the location, etc. After the site visits, the Events Committee will review the hard data and the additional insights from KMD before selecting the venue we feel is right for INCOSE IS 2025. This recommendation goes to the Board of Directors for approval before we engage in final venue negotiation and begin the process all over again for IS 2026.

In addition to the IW and IS, there are many regional and chapter events that are being planned. For a list of currently known events, see the INCOSE website. If you are planning an event and would like it listed on the events site or would like help from the events committee or MARCOM, please submit the event using the Event Submission Form. Whether you choose to attend online or in person in Honolulu, I look forward to seeing you at IS 2023 July 15-20, 2023.

By Donna Long, CSEP - Associate Director, Events

Upcoming Events

Systems Exchange Cafés

Maple Cafés
11 US Eastern Time
incose.org/maplecafe

Oak Cafés
8 AM London Time
incose.org/oakcafe

Fir Cafés
9 AM Japan Time
incose.org/fircafe

incose.org/events

Code of Ethics

We expect all our members to behave in accordance with the INCOSE Code of Ethics. This Code is concerned with how certain fundamental imperatives apply to one's conduct as an engineering professional. These imperatives are expressed in a general form to emphasize that principles which apply to engineering ethics are derived from more general ethical principles.

Click here to read the Code of Ethics on the INCOSE website.

Inspired by the *Telling Systems Stories: Making Technical Solutions Compelling* Workshop at IW2023, Kevin Weinstein wrote a poem to convince his employer to let him attend the International Symposium 2023.

There once was a great engineer
Whose mission became very clear
To go to Hawaii
Build business real mighty
And go and buy his boss a beer

So what is the point of the story?
Can we bring the company glory
If you don't send me away
On that fine July day
And let me go learn you'll be sorry

33rd Annual INCOSE international symposium

Honolulu HI USA
July 15-20, 2023

hybrid event

INNOVATION – Discover all the very latest practices, products and services during sessions and in the lively exhibit hall

NETWORKING – Exchange with fellow practitioners in government and industry, educators and researchers from all horizons

CONTRIBUTION – Share your own experience, points of view and best practice, and benefit from those of other participants

OPPORTUNITY - Take advantage of high-level tutorials to stay on the leading-edge in your field and enhance your practice

STATE OF THE ART – Enjoy a full and diversified program on different application domains: keynotes, presentations, panels...

ENGAGEMENT – Interact openly throughout the event, and become part of the largest worldwide community in Systems Engineering!

Technical program

6 Days, 6 Tracks, 3 Keynotes,
180+ Presentations, Panels, Tutorials and More!

- **160 +** Papers, Presentations on Systems Engineering
- **3** Inspiring Keynote Speakers
- **25** Countries Represented
- **25** Application Domains
- **40** Topics Represented
- **11** Panels
- **15** Tutorials

Registration: how much does it cost?

Be sure to sign up before June 4, 2023 to benefit from the early fee!

Member: In-person: $1,450 - Virtual: $550
Non Member: In-person:$1,895 - Virtual: $700
Senior Member: In-person:$995 - Virtual: $400
Student member: In-person: $550 - Virtual: $200

REGISTRATION TO OPEN SECOND HALF OF MARCH

incose.org/symp2023 **#INCOSEIS**

INCOSE Members Newsletter

Publication of the International Council on Systems Engineering

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Publication Schedule. The INCOSE Member Newsletter is published four times per year. **Issue and article/ advertisement submission deadlines are as follows:**

- Q2 2023 Newsletter: 15 May 2023
- Q3 2023 Newsletter: 15 August 2023
- Q4 2023 Newsletter: 15 November 2023
- Q1 2024 Newsletter: 15 February 2024

For further information on submissions and issue themes, visit the INCOSE website: www.incose.org/marcom

Who are we? INCOSE is a 21,000+ member organization of systems engineers and others interested in systems engineering. Its mission is to share, promote, and advance the best of systems engineering from across the globe for the benefit of humanity and the planet. INCOSE charters chapters worldwide, includes a corporate advisory board, and is led by elected officers and directors.

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A Better World Through a Systems Approach

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