

The NorthCoast Interfacer



2008 2009 – 2013, 2015 2014

President's Corner

First, a few announcements:

- Our next Chapter Meeting will be held May 17th, at 6 PM, at the Westlake Porter Library. Our speaker, John Fitch of Decision Driven Solutions, will present "All Faults are Decision Faults - and How to Prevent Them." We plan to order pizza to enjoy during the presentation! Keep an eye out for the Eventbrite invitation in the near future.
- I'd like to formally introduce Ted Schuler as our Chapter Secretary! We are very grateful for his willingness to support and help grow the chapter over the coming year. Make sure to introduce yourself at an upcoming Chapter Meeting!
- I'd like to thank Bill Klinger for acting as our stand-in Secretary over the past few months. Bill volunteered to take on this role and I am supremely appreciative of his minutes and action tracking to help keep us to task.
- The election for the INCOSE Director for Americas is open through May 5: I encourage you to review the candidate's platforms listed at the following link, and let me know of any preferences by May 3. The BoD will discuss the election at our May 1 meeting, but we can still consider late-breaking inputs! I'll submit our vote in the evening on May 5. (<http://www.incose.org/about/leadershiporganization/nominations>)

Now for the real story: Should INCOSE Grow a Relationship with the Institute of Industrial and Systems Engineers (IISE)?

My background is in Industrial Engineering and in college I was a student member of this organization when it was just called "Institute of Industrial Engineers (IIE)." IIE was founded in 1948 as a US organization (the American Institute of Industrial Engineers), and became an international organization in 1981. In 2016, IIE membership voted to change its name to IISE. In their 2016 Annual Report, they note "Today, the scope of our profession means working with large-scale, integrated systems and a change to incorporate 'systems' in our name better reflects the growth of this scope." 'Large-scale, integrated systems' sounds familiar...

I perused their website wondering if I'd find a new emphasis on what I've come to know as systems engineering, but didn't come up with much. It still appears to be the organization I knew in college, which characterizes industrial engineering as focused on improving productivity, reducing waste, and general optimization. I didn't find any distinction between Industrial Engineering and Systems Engineering on their website. I consulted our INCOSE Systems Engineering Book of Knowledge (SEBOK) to see what we say about them, and discovered "Industrial Engineering encompasses several aspects of Systems Engineering..." and the article went on to discuss the "synergies between IE and SE." We list a number of Industrial Engineering skills that would be of use to a Systems Engineer; I wonder if we've ever considered (or promoted) which Systems Engineering skills might be of interest to an Industrial Engineer?

Several IISE "Divisions" appear to be analogous to our Working Groups, listed in parentheses: Energy Systems (Power and Energy Systems), Lean (Lean Systems Engineering), Quality Control and Reliability (Reliability Engineering), and Engineering Economy (Cost Engineering). Surely, there must be opportunities to collaborate and network across those domains! I also noted the significant presence Operations Research presented throughout the organization, which uses a variety of mathematical and probabilistic models to describe and analyze complex system behavior. I seem to recall a recent motivation within INCOSE to increase the application of models within the Systems Engineering domain...

Lastly, I found it interesting that IISE has a strong student membership, but indicates converting those students to professional members is a challenge (myself included, apparently). From my perspective, it would appear INCOSE has the opposite challenge in establishing new student chapters. Maybe the two groups should compare notes! Selfishly, maybe INCOSE should recruit IISE graduates...

Certainly, while the two domains have skillsets that apply in both areas, I don't mean to imply we should all be one organization ("INCOISE," which is best pronounced with a New Jersey accent, if you will). It just seems to me that, with our powers (and models?) combined, we might change the world.

Katie Trase

C-NO President 2017

A Look Back

As I mentioned in the last newsletter, next year the Cleveland-Northern Ohio Chapter will be celebrating the Tenth Anniversary of our Chartering by INCOSE. A lot has happened in those ten years. What started out as an idea in the minds of four members, grew to a list of 29 interested individuals by the time of Chartering. The Chapter saw good growth in the first few years, and has been fairly steady at around 50 members since then. The Chapter has been fortunate to have a set of dedicated elected leaders every year and individuals serving in a number of other roles. The Chapter's Presidents are: John Juhasz (2008), Dan Gauntner (2009), Tony Johnson (2010), Dennis Rohn (2011), Joel Knapp (2012), Cody Farinacci (2013), Bill Klinger (2014), Carl Dister (2015), Marian Cronin (2016), Katie Trase (current), and Joe Stevens (President-Elect). Thank you, to the elected leaders and other volunteers for your service to this Chapter. If anyone is interested in getting involved, there are always ways that you can help, even if only in small ways. Contact a Board member if interested.

What are your Chapter highlights of the past ten years? I would be interested in hearing what you think were highlights, and I will incorporate some in future newsletter articles.

And, as was asked in the last newsletter: How should we celebrate our first ten years? And maybe more importantly, what should the vision be for the next ten?

Dennis Rohn

New Chapter Members

In February and March we've had two new members join the Chapter: Tim Schuler and Eric Hoelle.

Tim is a new INCOSE member. He is a business owner and Systems Engineer with over 33 years of aerospace industry and business experience, in private industry and supporting NASA via numerous engineering contracts. His current position is Lead Systems Engineer for the Flow Boiling and Condensation Experiment (FBCE) Project, a NASA Glenn Research Center in-house effort to develop an integrated two-phase flow boiling/condensation facility for the International Space Station (ISS) to serve as the primary platform for obtaining two-phase flow and heat transfer data in microgravity. His experiences include new product development, aeronautics and space test operations, test and facilities operations contract management at NASA's Plum Brook Station, and successfully starting and operating multiple technical services businesses.

Eric transferred in to our chapter and is employed by Booz Allen Hamilton Inc.

Welcome to both of you. The Board of Directors hopes the Chapter can aid you in your professional development, and looks forward to getting to know all of you.

Dennis Rohn

Cleveland-Northern Ohio Chapter Membership Chair

March 2017 Meeting Summary

PROGRAM: "The Evolution of MBSE to System-of-Systems (SoS) Design, Optimization, and Analysis"

Speaker: Dr. Horst Salzwedel (President & CTO of ML Design Technologies, Inc.)

Horst began by describing his youthful enthusiasm for aeronautics, as a boy in post-war Germany. At age ten, he wrote a detailed plan for manned space travel to Mars.

As a student at the Technical University of Munich, Horst once accompanied Wernher von Braun on a tour of the campus facilities. Upon learning of Horst's aerospace obsession, Von Braun asked, "Why don't you come to the U.S.?" Horst did exactly that, in 1971. He earned a Ph.D. in Aeronautical and Astronautical Sciences from Stanford University.

Horst was personally acquainted with Hermann Oberth (1894-1989), a founding father of rocketry and astronautics—enough so that Horst participated in the celebration of Oberth's 90th birthday, at Oberth's home in Feucht, near Nuremberg.

Horst discussed the historical application of modeling principles to aviation, and led into his premise:

Model-Based Systems Engineering is the only way to solve complex, dynamically coupled systems-of-systems problems at minimum risk and cost.

Some takeaways:

Simply agreeing on a common language across disciplines can be a problem. A universal lexicon is needed for successfully integrated design solutions.

- In the Classical Design Flow, critical problems were solved at high cost, because solving design problems during the Integration Stage maximizes the project risks.
- A purely requirements-based design methodology fails in the design of increasingly complex, networked systems, because the separate specifications at each design level do not account for dependencies between levels. Further:
 - Dynamic behavior is not considered in the early stages of the design process.
 - System behavior is not considered under all conditions (normal and abnormal).
- If the written specifications of conceptual development cannot be validated, they have a high level of uncertainty. Typically, 60% to 70% of the specifications are later changed, during development.
- When written specifications are not executable, no model of the overall system exists and the system cannot be optimized.
- Validated, executable specifications support project success.
- Mission Level Design Flow develops and combines overall executable specifications with Mission/Operational, Maintenance, and Usability Models, for a Customer-Level Virtual Prototype. With this virtual prototype, one can:
 - Optimize the architecture and function of the product.
 - Validate the executable specifications and significantly reduce development risk, development time, and cost.
- Use of the Minimum Risk Development (MRD) Process—in place of the traditional “Bottom Up” Development Process—has increased system performance 1000-fold and decreased development time by a factor of 100, in certain cases, according to Horst.

April 2017 Meeting Summary

INCOSE C-OH hosted a chapter event for systems engineering and engineering professional’s in Canton, Ohio at the Quarry Golf Club on April 22, 2017. This event included an overview of INCOSE and the benefits that our members can tap into, a presentation on The Art & Practice of Systems Engineering, an introductory presentation by MLDesign citing some real-world application Model Based Systems Engineering (MBSE) used in the aerospace industry and an open panel Q&A session.

Ms. Katie Trase kicked off the event with an overview presentation about INCOSE-COH. She cited several key benefits the chapter offers to its members such as systems engineering workshops, the ability to network/collaborate with other systems engineering professionals in Northeast Ohio as well as Michigan with our recent successes in combining feature speakers and an opportunity to acquire a universally recognized certification in systems engineering through the chapter.

Next, Mr. Joe Stevens presented a perspective of the Art & Practice in Systems Engineering from his previous education and work experiences. His presentation was designed to address questions in systems engineering that professionals may have on how to navigate their career development, obtaining necessary practical domain knowledge through formal education or on the job experiences and apply system thinking to shape and communicate abstract concepts into implementable designs. Part of the presentation highlighted the five disciplines of learning that were originally published by Mr. Peter Senge's "The Fifth Discipline – The Art & Practice of a Learning Organization." Mr. Stevens' perspective presented Mr. Senge's five disciplines in a tailored context as applied to smaller Integrated Product Teams (IPTs) – often led by systems engineers.

Following the feature presentation on system engineering, Mr. Horst Salzwedel and Mr. Robert Sarkessian (MLDesign CEO and President respectively) presented an introduction to MBSE and its importance to systems engineering as a tool for solving complex systems issues. One of the more important segments stressed the importance of designing robust and accurate physical and behavior models early in a program to avoid costly redesign or schedule delays.

Finally, a panel of four systems engineering experts participated in an open discussion and question and answer session. The panel consisted of two members from NASA Glenn Research Center (Mr. John Juhasz and Mr. Dennis Rohm) and two representatives from MLDesign (Mr. Salzwedel and Mr. Sarkessian). The panel members responded to several questions from the audience ranging from MBSE tools commonly used in systems engineering to the panel's vision of what systems engineering might look like in 10 -15 years from now.

In summary, the event went very well and provided an opportunity for systems engineering experts to make a connection with other engineering professionals and a couple of students who are investing in earning a degree in engineering who do not normally participate in the Cleveland based chapter meetings.

Future Events

The list below provides a sampling of upcoming events that may be of interest to INCOSE members.

May 17, 2017 at 11am EDT – INCOSE Webinar: "Systems Thinking", Robert Edson
<http://www.incose.org/ProductsPublications/webinars>

June 5, 2017 at 11am EDT – INCOSE Webinar: "INCOSE Leadership - What's in it for you?", Courtney Wright
<http://www.incose.org/ProductsPublications/webinars>

June 7, 2017 at 1pm EDT – Systems Engineering Research Center Webinar: “What Are Cyber-Social Learning Systems And How Will We Form Them?”, Kevin Sullivan

<http://www.sercuarc.org/events/serc-talks-what-are-cyber-social-learning-systems-and-how-will-we-form-them/>

[International Conference on Naturalistic Decision Making](#)

June 20-23, 2017, University of Bath, UK

[INCOSE International Symposium 2017](#) - Unlocking Innovation through Systems Engineering

July 17-20, 2017 in Adelaide, Australia

2018 SciTech, <http://www.aiaa-scitech.org/register/>

January 8 – 22, 2018 in Kissimmee, FL

Extended Abstracts due June 12, 2017

INCOSE International Symposium 2017: July 17-20, 2017 (Adelaide, Australia)

<http://www.incose.org/symp2017>

Paper submittal deadline has passed

11th Great Lakes Regional Conference: October 11-14, 2017 (Minneapolis/St. Paul, MN)

<http://www.incose.org/glrc11>

Papers, Panels, and Tutorials Proposal due May 27

EnergyTech 2017: October 17-19, 2017 (Cleveland, OH)

Paper submittal deadline TBD

INCOSE International Workshop 2018: January 20-23, 2018 (Jacksonville, FL)

<http://www.incose.org/IW2018>

No papers/presentations

INCOSE International Symposium 2018: 7-10, 2018 (Washington DC)

<http://www.incose.org/symp2018>

Paper submittal deadline TBD

Upcoming Chapter Meetings

➤ **May 17 6:00 PM - 7:30 PM**

Westlake Porter Public Library, Craft Room
27333 Center Ridge Road
Westlake, OH

Topic: All Faults are Decision Faults - and How to Prevent Them

Presenter: John Fitch

Registration Required: Register [Here](https://www.eventbrite.com/e/incose-c-noh-may-meeting-all-faults-are-decision-faults-and-how-to-prevent-them-tickets-34067224987?) via EventBrite
(<https://www.eventbrite.com/e/incose-c-noh-may-meeting-all-faults-are-decision-faults-and-how-to-prevent-them-tickets-34067224987?>)

Tickets are \$9, to cover the cost of pizza, being ordered from Sweet Basil Neapolitan Style Pizzeria

Abstract: Systems Engineers own the decisions that create the future. With that amazing responsibility comes the risk of failure. All system failures are ultimately decision failures. If you do root cause analysis on any failure by asking "What caused the cause?" you will eventually arrive at:

- A decision overlooked
- A decision poorly made
- A decision poorly implemented

This talk will elaborate on these decision failure modes and illustrate three methods to prevent them:

- A robust, proactive Decision Management methodology
- The use of Decision Patterns to frame the problem space
- The maintenance of Decision-to-Everything Traceability

Process change is hard and quick wins are essential, so shortcuts to build these capabilities into your Systems Engineering process will be explored.

➤ **June 20:** Book Club - The Revolt of the Engineers: Social Responsibility and the American Engineering Profession by Edwin T. Layton Jr. (1986)

Please join us this summer at the June 20th Chapter Meeting for a book review of this classic work by Edwin Layton. Have you considered what your personal responsibility is as a systems engineer in the workplace? Many engineers simply turn over their social responsibility to their employers or government, shirking their duties as world citizens. For example, has your systems engineering team ever specified requirements that would call for materials

hazardous to the environment, when other, perhaps slightly higher cost alternatives exist? Has your team ever specified components that required mining or assembly as part of the supply chain, where workers were not treated responsibly? Why do systems engineers rarely focus on the Disposal part of the lifecycle in the INCOSE Handbook? Is it wise to leave all this up to Boards of Directors and Governments when just a small incremental change, early in the process can make a big difference? Join us for an evening of interesting conversation and sharing of our stories as world citizens in the workplace.

If you are interested in this book discussion, please email carldister@ieee.org so we can order books in advance. More on location will be sent as we draw nearer to the event.

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