

# The NorthCoast Interfacer



2008    2009 – 2013, 2015    2014

## President's Corner: Systems Engineering your Puppy

After several years longing after a pet that didn't induce red bumps and watery eyes to form on me, I finally broke down and agreed to my husband's wish to get a puppy. Being trained in the art, it was only natural that I embark on a systems engineering journey to find the right breed, allocate puppy care between the two of us, and procure COTS equipment to ensure the proper subsystems are in place to realize a happy and thriving puppy (the mission). Besides, tailoring a puppy checklist would be too easy!

First things first, I conducted a trade study to evaluate which breed was best for us. To whittle down an enormous list of breeds, we selected several go/no-go attributes, such as hypoallergenic 'rating' and energy level. From this smaller pool of candidate breeds, we decided factors such as breed size, general health, temperament, and others were important to consider, and researched our options online. The Airedale Terrier won the day, and we proceeded to investigate area breeders, weighing their proximity to us, breeding practices, and cost.

After committing to our breed and breeder, my husband and I collaborated on a "puppy care ConOps" to derive the various responsibilities we'd need to cover as well as equipment we'd need to purchase. We envisioned our typical day, from morning through the night, and determined who would take on which roles, including which jobs were "nice to have" and which were real requirements (i.e., waking up repeatedly in the middle of the night for a potty break!). We also considered "off-nominal" scenarios, like vacations and road trips, to help consider perspectives of "secondary stakeholders," (puppy grandparents, vets, boarding facilities) and inform our budget. Having these top-level concepts in mind, we got to work on detailed specifications for equipment, including crates, leashes, water and food bowls, and toys. With the Bill of Materials specified, we calculated estimates from local and online retailers to supply the COTS equipment.

We have recently transitioned from the concept/development phase to the operational phase:



our puppy came home in late October! While we've had a few bumps in the road (we applied too much Neck Growth Allowance (NGA) and had to procure a smaller collar), we are generally operating smoothly. World, meet Ivan (the Terrier/Terrible)!

Katie Trase  
C-NO President 2017

## Looking to the Future

For the past few newsletters, I have authored articles titled “*A Look Back*” where I discussed the Chapter’s history over the past ten years. For this newsletter, I’d like to look forward. Imagine it is the year 2027 and someone is writing a 20<sup>th</sup> year anniversary article. What will it contain? Will the Chapter be vibrant and growing, will we look just like we do today, or will we have faded and been disbanded? Let’s envision that vibrant, growing Chapter.....

Last month, on September 16, 2027, Chapter leadership travelled to Columbus to receive an award from the Governor of Ohio, for the work the Chapter has done to support the infusion of systems engineering into the northern-Ohio business community and other organizations, creating strong growth in the region, especially in the area of medical, energy and extremely small enterprises. A highlight of the trip was flying in the new pilotless electric aircraft between Cleveland and Columbus. The Chapter is planning to apply the same systems engineering infusion approach to some of the regions social problems over the next year. This month, the Chapter reached the 250 member milestone, which was celebrated by over 100 attendees at the Chapter’s October Chapter meeting, during which we also took a tour of the

Engineering Cleveland Holo-facility, where they do the majority of their engineering using holographic models. In November, we are looking forward to establishing our fifth student Division at local universities. Also, mark your Calendar for our December Science, Technology, Engineering, and Math event at the Convention Center. We are expecting over 1000 local high school students, so can use everyone available, to help make this the best Chapter event ever.

So maybe the above is currently fiction, but wouldn't it be great? Some science fiction has come true, hasn't it?

How can we move to be a more vibrant growing chapter? Looking forward, what types of events would you like to see the Chapter hold and what topics would you like to see addressed? What would make your Chapter membership value-added? How would you like to get involved? Let us know!

As I have asked in past articles, how should we celebrate our first ten years? And maybe more importantly, what should the vision be for the next ten? Let Chapter Board members know your thoughts. And help us realize that vision!

Dennis Rohn

## **Apply for free attendance at the Regional Complexity Seminar in April 2018!**

In partnership with the Americas Sector, your Cleveland-Northern Ohio Chapter has sponsored the Regional Complexity Seminar, being organized by our past president, Carl Dister (see Carl's announcement in this newsletter!). As a result of this sponsorship, the chapter is pleased to offer two individuals with free registration for this event, held on April 20th, 2018!

By December 15th, please submit a short write-up (a paragraph or so; no more than a half-page) to Katie Trase ([kathryn.trase@nasa.gov](mailto:kathryn.trase@nasa.gov)), addressing the following:

1. What skills might systems engineers contribute to tackling regional complexity issues, which other professionals might leverage?
2. How might you envision the Cleveland-Northern Ohio chapter engage with area organizations to tackle issues in our area?
3. List the length of your membership in the chapter and positions held over the last 5 years.

## INCOSE Central Elections

The INCOSE Central Nominations & Elections Committee works year-round to identify and cultivate candidates for international leadership positions. From November 1st through 22nd, 2017, you will have the opportunity to vote for positions listed below with the successful candidates installed in office at the 2018 International Workshop. Each candidates Vision and Bio can be accessed at this link: <http://www.incose.org/about/leadershiporganization/elections>

## Training Opportunity: Baldwin Wallace Business School offering Requirements Training Courses

Review course details, pricing, and scheduled offerings at this link:

<https://pdenroll.bw.edu/CourseStatus.awp?&course=18Q1BAC>

| Course Title                                | Scheduled Offering   |
|---|----------------------|
| Business Analysis Success (3.0)             | February 27-28, 2018 |
| Eliciting & Documenting Requirements        | March 20-21, 2018    |
| Requirements Analysis and Design Definition | April 17-18, 2018    |
| Solution Deployment & Evaluation            | June 5-6, 2018       |

## Regional Complexity Conference: April 20th, 2018 at Kent State University - Ashtabula Campus

Our local INCOSE Chapter Leadership and INCOSE Regional Leadership are sponsoring the upcoming *Regional Complexity Conference* at Kent State in 2018. You can register at the following link: [http://www.kent.edu/ashtabula/regional\\_complexity\\_seminar](http://www.kent.edu/ashtabula/regional_complexity_seminar)

As INCOSE advances along the Vision 2025 to apply SE practices to complex social issues, this conference will allow you to interact with world-class social scientists, right in our area! How do the complexity sciences get applied into everyday work by Social Scientists? Do they use the same SE practices (e.g. Verification, Validation, Architecture, etc.)? How do they manage requirements? What would it look like for Systems Engineers and Social Scientists to work together in teams on complex sociotechnical systems, or even complex social systems? Can Systems Engineers like you leverage your SE skills to fight opioid addiction in Northeast Ohio, for example?

If you have any questions regarding the conference, feel free to contact Carl Dister at [carl.dister@rfirst.org](mailto:carl.dister@rfirst.org)

## New Chapter Members

In August we had one new members join the Chapter: Adrian Thompson (L3 Technologies).

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

Dennis Rohn

Cleveland-Northern Ohio Chapter Membership Chair

## Annual INCOSE International Workshop 2018

The 2018 Annual INCOSE International Workshop will be held January 20 – January 23, 2018 in Jacksonville, FL at the **Hyatt Regency Jacksonville Riverfront**. This annual event is *the* place for systems engineers to contribute to the state of the art in systems engineering. A completely working event (no papers, panels, or presentations), IW is intended to enable INCOSE Working Group members, Chapter leadership, International leadership and the INCOSE administrative committees to advance progress on the products and activities of INCOSE and to share best practices.

Two kinds of working group sessions are available at IW 2018, Working Sessions and Outreach Sessions. Working sessions are the best place to actively contribute to working group products and interact with experts in the field. Outreach sessions are intended to disseminate the current state of the art to attendees with little previous exposure to working groups – a great place to start if you have not attended IW before!

Online registration for IW 2018 opens in November, and closes three working days prior to the event. The registration fee structure will accommodate attendees who plan to participate for one day, or up to all four days of the workshop as shown on the workshop registration website. <http://www.incose.org/iw2018/home>

## Highlights of the 27th Annual INCOSE International Symposium

The 27<sup>th</sup> annual INCOSE international symposium was held at the Adelaide Convention Centre in Adelaide, Australia from July 15 through July 20, 2017. There were around 600 delegates in attendance. The first two days featured tutorial sessions, working group meetings, and the Corporate Advisory Board meeting. Keynote talks were held the next three mornings of the symposium, followed by multiple parallel sessions. The final day had a keynote speaker in the afternoon, followed by the conference conclusion. All the keynote talks are available from links on the IS2017 Videos website. There were many academic, tool, and other vendors at the exhibits. A highlight of the week was the awarding of a Silver Circle award to the Cleveland-North Ohio chapter.

The Monday Keynote talk, “Force Design: Evolution not Revolution,” was by Mel Hupfeld of Australian Government Department of Defence. He discussed the structure of military acquisition that emphasizes process over outcomes and rewards federated rather than enterprise behaviors. They set up a separate Division about 15 months ago called Force Design that is distributed across the armed services and is functioning differently than traditional acquisition to enable informed investment into a portfolio of programs. He cited recent, improved results.

The Tuesday Keynote talk, “The Japanese Bullet Train “Shinkansen” System: Its Genesis and Safety Assurance,” was by Dr. Tomohiko Taniguchi, Prof. at Keio U. Graduate School of System Design and Management. Prof. Taniguchi gave an overview of the political environment that existed after WWII in Japan and how the “Dream Car” was a matter of national pride and had a time constraint for the Tokyo Olympic Games in 1964. He discussed how the designers went against conventional wisdom (new system must be connected to existing rails, be locomotive-drawn to reduce coach car noise, must run on embankments as protection against earthquakes) to envision and construct a system with dedicated, elevated, separate west-bound and east-bound tracks with no level crossings and with monitoring to detect people or animals on the tracks. Since 1964, there is a zero incident track record and the system has scaled up to cover all the major islands. In the fall, the lines see 15 services per hour with 450,000 passengers per day to see the autumn colors.

The Wednesday keynote address, “Systems Engineering and Autonomy: Opportunities and Challenges,” was by Paul Nielsen, Director and CEO, Software Engineering Institute, Carnegie Mellon University. Dr. Nielsen is a former USAF General responsible for all the AF research. He is a physicist not a software person. He thinks we are at an inflection point in science and engineering with the push for more autonomy in all our systems. There is good and bad in all this. Trust is the major issue for autonomous systems. In addition to the normal software and system vulnerabilities, there is mistraining, spoofing, hidden modes. He cited the need for new V&V strategies and the use of data past deployment for continuous learning. Increased autonomy and artificial intelligence (AI) are coming soon and coming fast. Current tools and processes may not be sufficient. Transitioning will depend on establishing and building trust (non-deterministic techniques, systems continue to learn, human-machine teaming). Solid system engineering will be important and determine if we are creating C3PO and Johnny 5.

The closing plenary session keynote talk was “Space Weather: Understanding and Mitigating Impacts on our Interconnected and Interdependent Critical Infrastructure,” by Bill Murtagh, NOAA. He talked about space weather, types of impacts, extreme space weather events, and response procedures. He posed the following question: what would happen if we lost GPS for a day or a week? He discussed the vulnerability of the electrical power grid, cited recent and past (1859, 1921) space weather events, and described the response from US and international leaders.

One topical area covered in at least one paper presentation and two panels was on systems science, and systems thinking and design thinking. Session 3.6.1 on “SE Fundamentals on Systems thinking: Systems thinking - inspiring success,” was by Patrick Godfrey, INCOSE Fellow and RAE Fellow. He presented an overview of the topic. Important concepts are those of complexity, uncertainty, conflict, and scale. For today’s large systems that are too complex for one person to understand, we need to improve our systems thinking ability. The first panel discussion, “Exploring the Frontiers of Systems Science: Establishing a Foundation for SE Practice,” was moderated by James Martin, Aerospace Corp. Panel members were Rick Dove, Paradigm Shift, David Rousseau, Centre for Systems Philosophy and President of Internal Society of Systems Sciences, Anand Kumar, Tata Consultancy Services, Tim Ferris, Cranfield University, and Stephen Cook, U. of Adelaide and Shoal Engineering. The general topic was on how current systems engineering practice appears to lack a good foundation in Systems Science. The Systems Science community is working with INCOSE to improve this situation and to provide better outcomes. The second panel, “The Role of Design in Systems Engineering - Systems Thinking Meets Design Thinking,” was moderated by Jon Wade, Stevens Institute. Panelists were Anna-Maria McGowan NASA LaRC, Kristin L. Wood, MIT and Singapore U., Peter Jackson, Singapore U. of Technology and Design, and Marija Jankovic Centrale Supélec (France). The general topic was on the role of design and how it is essential for systems engineering and has been on the decline. It is time to bring it back into the foreground. There is a tension between creativity vs. rigor. Design thinking and systems engineering are both very broad communities with a rich set of “flavors.”

REMINDER: The 28<sup>th</sup> Annual INCOSE International Symposium, July 7 to 12, 2018, is in Washington, DC. The paper, panel, and tutorial submission deadline is November 10, 2017.

Karen J. Weiland, Ph.D.

## September Chapter Behind the Scenes Tour of Cedar Point

The Chapter sponsored a behind-the-scenes tour of some of the Cedar Point rides on Friday, September 22, 2017. The weather was gorgeous for the 26 chapter members and guests who attended. Our hosts took us to four of the rides and discussed the various control features, sensors, operations, and maintenance associated with them. A highlight of the tour was an opportunity to go into the hydraulics building for the Top Thrill Dragster ride, where we got to see the massive system that spins up the cable drum fast enough to pull the cart that launches

the ride's vehicles up the ride's tower. A subset of the group stayed to ride the rides and enjoy the wonderful weather.



The Group assembled at Top Thrill Dragster, hoping for a chance to get a ride



Wicked Twister Car



WindSeeker



## October GLRC 11 Professional Development Day in Cleveland

On October 13, 2017, the Great Lakes Regional Conference broadcast presentations from their Twin Cities, Minnesota site to multiple remote sites as part of a systems engineering Professional Development Day. The Cleveland-Northern Ohio Chapter sponsored a local site and 20 people gathered at NASA Glenn Research Center to participate. Participants, who ranged from a high school student to senior practitioners, not only listened to the presentations, but also discussed some of the topics during breaks. A big thanks to Chapter President Katie Trase for all of her efforts to make this happen!



*Cleveland GLRC11 SE Professional Development Day Participants*

## Future Events

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

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

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

- <http://www.incose.org/IW2018>
- No papers/presentations

March 4-11, 2018 – IEEE Aerospace Conference (Big Sky, Montana)

- <http://aeroconf.org/>
- Abstracts submittal deadline has passed

April 23-26, 2018 – 2018 IEEE International Systems Conference (Vancouver, Canada)

- <http://ieeesystemscouncil.org/>
- Initial Manuscript deadline – November 1, 2017

May 8-9, 2017 – CSER 2018 16th Annual Conference on System Engineering Research

- <http://www.sercuarc.org/events/16th-annual-conference-on-systems-engineering/>

July 7-12, 2018 – INCOSE International Symposium 2018 (Washington DC)

- <http://www.incose.org/symp2018>
- Paper submittal deadline – November 11, 2017

July 22-27, 2018 – 62nd Conference of the International Society for the Science of Systems (ISSS) (Corvallis, OR)

- [http://iss.org/world/ISSS2018\\_Corvallis](http://iss.org/world/ISSS2018_Corvallis)

Dennis Rohn

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### **2017 Chapter Officers:**

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Katie Trase

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Joe Stevens

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