The NorthCoast Interfacer

2008   2009 - 2013   2014

President's Corner

Our chapter warmly welcomed new member Mike Hurrell at the June Chapter Meeting, held at Mavis Winkle's in Independence. Mike is Systems Engineering for HX5 Sierra LLC. Throughout his career Mike has moved from a specialty in Mechanical Engineering, broadening out with a background in business and systems. Welcome Mike!

At the June meeting, we shared best practices in the INCOSE Process Area of Operations. All the attendees shared in the realization that as Systems Engineers, we do not typically architect Anti-Fragility into Systems, especially for the Operations part of lifecycle. This would typically require some sort of expert system or artificial intelligence. However, in some environments, learning organizations, or those with special incentive systems, may promote Anti-Fragility in Operations. (Note: *Resiliency* = "Recovering from a disturbance." *Anti-Fragility* = "Recovering to an even stronger state, after a disturbance.)

Make sure to register for the INCOSE Great Lakes Regional Conference, right here in Cleveland in October:

Registration Link: https://www.regonline.com/glrc9

Event Website: http://www.incose.org/ChaptersGroups/Chapters/ChapterSites/cleveland-northern-ohio/chapter-events/glrc9

Immediately after the GLRC9 Conference, the Information Security Summit will be held in Westlake. This will provide an opportunity to learn more about design and operation of security systems (both Cyber and Physical) for your next Systems Project.

We also look forward to seeing you at the July meeting where we will report out on the latest Systems Engineering developments from IS2015.

Sincerely,
Carl Dister
C-NO President (2015)

New Chapter Members

We welcome two new members since the beginning of May: John Burrell and Michael Hollopeter. The Board of Directors looks forward to meeting you, at future Chapter meetings or events.

Dennis Rohn
Cleveland-Northern Ohio Chapter Membership Chair

June Meeting Notes

DISCUSSION TOPIC: "The *Operations* Process Area"
Carl had prepared three tables in the private meeting room at Mavis Winkle's, each well supplied for a World Café-style event. However, due to the modest attendance, we agreed that Carl should simply lead the entire group at once, instead of having three facilitators conduct concurrent rounds of discussions.
Carl posed three questions and then captured the summary responses, bulleted below:
Question 1: In the systems you work on, what requirements typically apply to Operations?
- Software Usability (e.g., Graphical User Interfaces)
- The "-ilities" – Availability, Reliability, Operability… (see wiki page of all of them)
- Manufacturing Throughput Requirements (e.g., very high-volume Proctor & Gamble Diapers vs. NASA one-off's)
- Lead Times for Parts
- Obsolescence Plans
- Sustaining Operation Budget Allocations (unfortunately, this usually happens only *after* an adverse incident!)
- Low-Cost Reparability
- Human System Integration (HSI)
- End-User Instructions
- Compliance or Regulatory Constraints (e.g., Safety)
- Ergonomics and Human Factors
- Lifecycle Failure Requirements
- Minimum number of tools required, for repair and operation.

Question 2: What Systems Engineering Models do you use to estimate the performance of the system during Operations, especially those that take into account human operators?
- Stress Analysis
- Operational Risk Modeling
- Agent-Based Models
- FMEAs and Fault Trees
- Software Stress on System (e.g., from Labeling Company Order-Processing Volumes)
- Test Prototypes for hardware
- Story: One attendee shared how an outsourced software stress test went bad: the validation answers were hard coded into the code!

- FORTRAN model (back in the days of the Higbee's department store) to analyze how many people pass through a store during a sales event.
- Big Data Analytics, being used as a modeling tool in Market Studies.
- Functional Workflows and State Process Models
- Vitech *Core*: SysML Activity Diagrams
- Story: Don't forget, some people who operate the system have English as a second language, or may not read at all.
- Linear Programming Queueing models (e.g., airlines)
- Classic Optimization of Models
- NASA "Space" program (detects solar rays and positioning, to estimate power availability in space)
- Human Factor Models (e.g., ergonomics for reaching)
- Market Surveys (e.g., Taste Tests at Easton Mall in Columbus, Ohio)
- Monitoring (e.g., Solar Panels in homes).

Question 3: How do you architect and design your systems during the Development Cycle, to perform with Resiliency and Anti-Fragility during the Operational Cycle?
[Definitions: *Resiliency* = "Recovering from a disturbance." *Anti-Fragility* = "Recovering to an even stronger state, after a disturbance."]

- Anti-Fragility is rarely "designed in" to systems. This objective requires "intelligent" systems that learn. This is new for most of us. How can this be done with materials? Cutting edge!
- We should design-in Anti-Fragility, whenever human life is at stake.
- Manufacturing Incentive Systems (e.g., self-directed work teams, with profit sharing) are anti-fragile, or could be (i.e., continuous improvement).
- Analog Backups for Human-Life-Critical Systems, using different technologies for each redundant system.
- Community-Supported Open Source Architectures could be anti-fragile (*if* the community supports them; if not, closed source may be better.)
- Lessons Learned Processes
- Maintainability and Incidence Response Systems
- Self-Healing Materials with Survivability Requirements
- More *ad hoc* Modular Systems, to reduce downtime (e.g., "Dev Ops").
- Cut off a section of the system, while the rest of the system keeps going (e.g., Cyber IT System Architectures).
- Radiation-Tolerant Parts that take into account Single Event Upsets, by having error-correcting code and proper resetting of processors.
- Redundancy and Fault-Tolerance Requirements (e.g., Space / Mil / Aero).
- Anti-Fragility and Resiliency are often industry-specific (e.g., Data Acquisition Systems).
- Robustness and Safety Margin built into designs add resiliency, although probably not anti-fragility.
- Alternate Markets after Primary Market is past its prime is an example of anti-fragility.
- Training Requirements (or operators) help with anti-fragility and resiliency issues.

INCOSE IT Changes
Member Profile

A few months ago, INCOSE transitioned to its new IT infrastructure. As a result, the look and feel of the Member profile area and member search function have changed. If you have not taken a look at it, I would encourage you to do so. After you log in to the INCOSE Website, you will see a link at the top to go to your member profile.
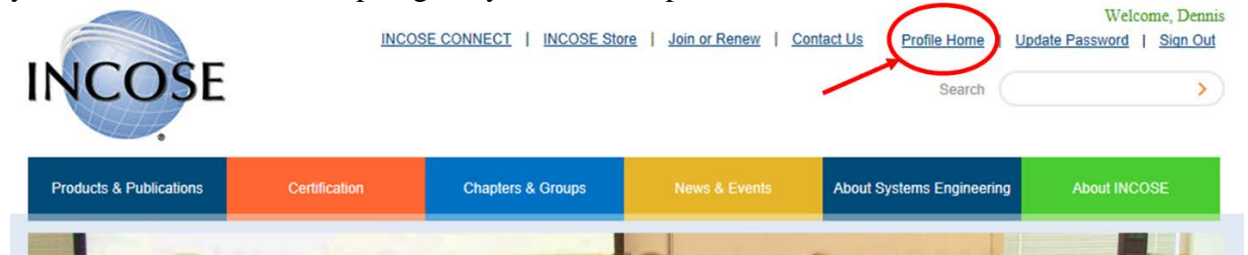
Once at your profile home, there are a number of things you can do, in addition to changing your personal details.

Purchase/download INCOSE items

Add a profile picture

Manage your certification

Search the membership directory

Join Working Groups

Subscribe to hardcopies of publications

Dennis Rohn
INCOSE Cleveland-Northern Ohio Chapter Webmaster

Upcoming Chapter Meeting

July 21st 5:30 pm
Members will report out from this year's INCOSE International Symposium.
Keep an eye on your email for more information.

Great Lakes Regional Conference 2015

Don't forget that our chapter is hosting the Great Lakes Regional Conference next October.
Visit the INCOSE GLRC9 Page for more information.

Have a fun and safe July 4th.

Like us on Facebook

If you are on Facebook, search for <u>Cleveland-Northern Ohio INCOSE Chapter</u> and "like" us.

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Carl J. Dister

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Katie Trase

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