INCOSE Michigan Chapter

Monthly Newsletter

April 2026

In This Issue

President's Message

March was a very busy month! On March 11, I was happy to reprise my talk, "How to Avoid the Zombie Apocalypse in Systems Engineering," as the guest speaker for the INCOSE Washington Metro Area. March 14th brought us to *The Dungeon Cocktail Experience*; during this improv theater, the performers did a great job of working in a lot of systems engineering content as the medieval kingdom worked hard to fix and test its Soul Cannon to repel a minotaur invasion. Jonathan Weaver conducted his Systematic Innovation Toolkit workshop on March 24 (supplemented with some excellent BBQ from Midtown Smokehouse). It was thought provoking and highlighted the importance of understanding the actual problem first…and thoughtfully exploring the solution space.

I will be attending our next Engineering Expedition, *The Rise and Fall of the DeLorean Motor Company*, at the Packard Proving Grounds on April 12th. Our April SysML v2.0 Boot Camp (held in conjunction with Dassault Systèmes) is sold out! I was fortunate enough to attend this when the North Texas Chapter hosted it and know that our attendees will benefit enormously from seeing SysML 2.0 in action. I have not decided whether I will be at the Selfridge Military Air Museum Tour on April 25th but encourage you to take advantage of this opportunity if your schedule permits.

I want to close by sharing how special March 18th was for me; it was the evening of the annual ESD Affiliate Council Gold Awards Banquet. I have emceed it for years and am always glad to be a part of the evening's festivities as local society chapters celebrate individual excellence and impact on our Detroit professional community. We recognized Robin Mikola for her work as Academic Chair engaging the Michigan Technological University student chapter and its work on NASA's Artemis Base Camp regolith mitigation challenge. We also recognized her contributions as INCOSE Michigan President and Vice-President. I was also honored to receive the ESD Affiliate Council Gold Award; I was nominated by the INCOSE Michigan Chapter. This award recognizes outstanding individuals with demonstrated prominence in engineering. I am grateful that the chapter nominated me for this recognition and am honored that the selection committee considered me to be a worthy candidate.

I hope that you will take advantage of the upcoming programming offered by INCOSE Michigan; I hope to see you at one of our events.

Michael J. Vinarcik, ESEP-Acq, P.E, FESD

President

Dungeon Cocktail Experience performers, King Michael, Queen Angela, performer, Nathan Vinarcik (Secretary), and Sloane Dietz at *The Dungeon Cocktail Experience*

Michael Vinarcik (President), Johnathan Weaver, Ph.D., Karl Selewski (Vice-President)

Dean Norfleet (Treasurer), Robin Mikola (Academic Chair | INCOSE MI Outstanding Service Award), Michael Vinarcik (President | ESD Affiliate Council Gold Award), and Nathan Vinarcik (Secretary) at the Engineering Society of Detroit Affiliate Council Gold Awards Banquet

Upcoming Events Calendar

Date	Event	Organization
April 12	The Rise and Fall of the DeLorean Motor Company	Packard Proving Grounds
April 14-16	SysML v2 3-Day Bootcamp	INCOSE Michigan Chapter
April 17	Spring Symposium: AI in PM	PMI Great Lakes Chapter
April 17	Michigan Technical University Presentation	INCOSE Michigan Chapter
April 25	Selfridge Military Air Museum Tour	ESD and SAE Detroit Section
May	Addressing Siloed Risk Analysis: Developing a Holistic Safety and Reliability Ecosystem using MBSE and the Risk Assessment and Modeling Language (RAAML)	INCOSE Michigan Chapter
June 6	SysML 2.0 Vendor Day	INCOSE Michigan Chapter
June 13	Packards & Pours	Packard Proving Grounds

Upcoming Chapter Events

Engineering Expedition: The Rise and Fall of the DeLorean Motor Company

Date: Sunday, April 12, 2026
Time: 1:00 – 2:00 p.m.
Location: Packard Proving Grounds Historic Site, 49965 Van Dyke Avenue, Shelby Township MI 48317

Step onto the grounds of a National Register-listed, Albert Kahn–designed automotive proving facility and hear the dramatic story of John DeLorean's audacious attempt to build a revolutionary sports car company from scratch. From his meteoric rise at General Motors to the stainless-steel DMC-12 and the company's spectacular collapse, DeLorean's saga is a case study in entrepreneurial ambition, engineering risk, and systems-level decision-making gone wrong.

This talk is part of the Packard Proving Grounds' popular monthly Historical Speaker Series, which regularly draws 50+ attendees for topics at the intersection of automotive history, engineering, and Michigan heritage. Tickets are $5 for non-members, free for PPG members, and proceeds support ongoing restoration of the historic site.

Cost: $5

Register at https://packardprovinggrounds.org/event/historical-speaker-series-the-rise-and-fall-of-the-delorean-motor-company/

SysML v2 3-Day Intensive Bootcamp

Date: April 14-16, 2026, 8:00 AM - 5:00 PM

Location: Dassault Systèmes, 118 N. Main Street, Suite 200, Royal Oak, MI 48067

Hosted by: INCOSE Michigan Chapter & Dassault Systèmes

This in-person 3-Day Intensive SysML v2 course will teach you the three pillars of Model-Based Systems Engineering: Language, Tool, and Methodology. You'll learn the fundamentals of the new language through lectures, demonstrations, and hands-on activities using CATIA Magic 2026x.

Cost: $150 (30 seats will be available) **SOLD OUT**

Michigan Technical University Presentation

Date: Thursday, April 16, 2026, 7:00 PM - 8:30 PM

Location: Virtual

Join us for Michigan Tech's 2026 systems engineering capstone team on Thursday April 16th at 7:00 PM. The 2026 seniors will present their collaborative project with NASA to address the critical challenge of mitigating the impact of lunar regolith on the Cryogenic Magnetically Latching Coupler (CryoMag connector). Learn how they overcame this challenge and how they increased the reliability of cryogenic fluid transfer on missions in the Artemis program. We hope to see you there.

https://lp.constantcontactpages.com/ev/reg/gmtjhfh/lp/24e3ba35-8c8d-46b8-80ba-307f45709e30

Addressing Siloed Risk Analysis: Developing a Holistic Safety and Reliability Ecosystem using MBSE and the Risk Assessment and Modeling Language (RAAML)

Date: May TBD, 6:00 PM - 8:00 PM (Dinner provided)

Location: The Engineering Society of Detroit, 20700 Civic Center Drive, Suite 450, Southfield, MI 48076

Model-Based Systems Engineering (MBSE) replaces siloed, document-centric processes with integrated digital workflows, establishing a shared digital model as the authoritative design description rather than a collection of disconnected documents. While modern safety and reliability methods increasingly leverage these digital models as a baseline, they often lead to duplicative risk assessments due to unique representations of risk across analysis types such as Failure Mode and Effects Analysis (FMEA), Functional Safety (FuSa), and System Theoretic Process Analysis (STPA). This fragmentation obscures critical interdependencies between system functions and risk evaluations, potentially masking emergent failure modes and creating significant manual overhead to synchronize data as the architecture and risk assessments evolve.

This presentation demonstrates how the Risk Assessment and Modeling Language (RAAML) — an OMG-standardized modeling language designed to formally represent safety and reliability analyses within a system model — can be leveraged to consolidate these standalone workstreams into a holistic safety ecosystem, starting with Failure Mode and Effects Analysis. The presentation will explore how RAAML-compliant model-based failure mode avoidance can be integrated with descriptive system architecture models to enable inter-model read-across and reuse of both risk and architecture elements at scale. It will also outline how the comprehensive nature of RAAML enables the integration of additional risk analysis types into this holistic ecosystem as MBSE tooling and industry adoption continue to mature. This transformative approach integrates separate safety workstreams into a unified, verifiable representation of system risk that is intrinsically linked to the design intent.

About the Presenter

Jeremy Ross is an engineering supervisor at Ford Motor Company, leading development of the company's model-based systems engineering (MBSE) and failure mode avoidance tools and methods. He holds degrees in Mechanical Engineering (BSE, MSE) from the University of Michigan and in Product Development (MS) with a Systems Engineering specialization from the University of Detroit Mercy. Jeremy is a Certified Systems Engineering Professional (CSEP) and an adjunct instructor at the University of Detroit Mercy, where he lectures on MBSE and SysML. Jeremy is a frequent contributor to conferences and technical publications in the systems engineering domain, with honors including a best paper at the 2022 INCOSE International Symposium and 2024 System Modeler of the Year (Zuken/Vitech Integrate24).

SysML v2 Vendor Showcase

Date: June 6, 2026

Location: TBD

This in-person event will give tool vendors the opportunity to show how their SysML v2 tools addressed one of two provided engineering challenges; we will also allow them to demonstrate model interchangeability. More details to follow!

Sidequest Social: Packards & Pours

Date: Saturday, June 13, 2026
Time: 6:00 – 10:00 p.m.
Location: Packard Proving Grounds Historic Site, 49965 Van Dyke Avenue, Shelby Township, MI 48317

Craft beer, wine, cocktails — and classic cars under the evening sky at one of Michigan's most atmospheric automotive heritage sites. Packards & Pours is the Packard Motor Car Foundation's signature summer fundraiser (formerly Packards & Pints), set among the original 1928 Tudor Revival buildings where Packard engineers once tested luxury automobiles on a 2.5-mile oval track.

Tour the historic Lodge, Repair Garage, and WWII Tank Test Center while enjoying drinks, food, and live music. All proceeds support the continued restoration of this 17-acre landmark. This is a relaxed, social evening — an ideal opportunity for chapter members and guests to mingle in a setting that practically defines Michigan automotive heritage.

Cost: $50

Register at https://packardprovinggrounds.org/event/packards-pours/

Partner Organization Events

PMI Great Lakes Chapter

2026 Spring Symposium: Implementing AI in a Project Management World

Date: Thursday, April 17, 2026, 7:00 AM - 5:00 PM

Location: Suburban Collection Showplace, 46100 Grand River Ave, Novi, MI 48374

Join PMI Great Lakes for their annual symposium featuring keynote speaker Princess Castleberry, CEO of Castleberry Global and author of *The Truth Is in the Trigger*™.

Opening Keynote: AI-Ready Leadership: Managing Projects in the World of Generative, Predictive, and Agentic AI. Learn how to integrate AI across the project lifecycle and evaluate AI readiness through data integrity, ethical governance, and human adaptability.

Closing Keynote: *The Truth Is in the Trigger*™: Leading Under Pressure in the Age of AI. Discover how behavioral pressure shapes decisions and collaboration during high-stakes project cycles in AI-driven environments.

What to Expect:

- Networking with fellow project management professionals
- Breakout sessions (details TBA)
- Interaction with sponsors

PDUs: 17.0 | **Cost:** Members $250 | Non-members $310

Register: https://pmiglc.org/calendar?eventId=44816

Note: Cancellations up to 5 days before the event subject to $8 processing fee; no refunds after the Friday before the Symposium.

Engineering Expeditions: SAE Detroit Section & ESD – Selfridge Military Air Museum Tour

Date: Friday, April 24, 2026
Time: 12:30 – 3:00 p.m.
Location: Selfridge Military Air Museum, 27333 C St, Harrison Township, MI 48045
Registration Deadline: April 16, 2026

Through our partnership with the SAE Detroit Section, INCOSE Michigan members are invited to join a guided tour of the Selfridge Military Air Museum, co-hosted with the Engineering Society of Detroit (ESD). The tour includes indoor exhibits, the new Aviation Education Center, and the outdoor Air Park featuring full-scale aircraft from the U.S. Air Force, Army, Navy, Marine Corps, and Coast Guard.

Selfridge is one of the nation's oldest continuously operating military airfields. For more than a century, it has played a central role in aviation innovation, illustrating the evolution of military, aerospace, and systems engineering from World War I to today, from early propeller-driven aircraft to jet-powered, high-speed, and systems-integrated aviation.

Agenda:

- 12:30 – 1:00 p.m.: Registration
- 1:00 – 3:00 p.m.: Tour

⚠️ **MANDATORY BACKGROUND CHECK REQUIRED:**
The museum is located on an active military installation. All visitors must complete a background check at https://selfridgeairmuseum.org/base-access-pre-registration/ **no later than 7 days before the event** (30 days for foreign nationals).
Registration: INCOSE Michigan members may register at SAE member pricing by entering **"INCOSE"** as their SAE member ID during registration.

Note: Tour is limited to members and guests 10 years and older.

Register: https://www.sae-detroit.org/register/?id=491
Questions: Contact Cassandra Irick at cassandra.irick@sae-detroit.org or (248) 324-4445 ext. 6

Other INCOSE Chapter Events

INCOSE WMA Chapter: Academic Showcase

Date: Tuesday, April 28, 2026, 6:00-8:00 PM

Format: Virtual (Zoom)

Topic: The WMA Chapter is inviting universities to present details about their graduate programs and SEP equivalence.

Register: **https://www.incosewma.org/**

Other Events

ASM International Detroit Chapter:
Woodside Lecture: Iron: How One Element Built Our World

Save the Date: May 4, 2026, 5:30-8:00 PM, Livonia Marriott

Iron is ubiquitous and remains the backbone of society. This talk will go through the history of iron and steel and show how the sheer volume of this “miracle” material makes it so precious. Special emphasis will be made on how Detroit has played a vital role in contributing to, sometimes, step changes in its properties or understanding making this wonderful element a cornerstone of the economy.

Historical Corner

This Month in SE History: Special Double Feature

Two Aprils, 35 Years Apart: The Evolution of Reusable Spaceflight
STS-1: April 12, 1981 (45 years) | SpaceX CRS-8: April 8, 2016 (10 years)

April 2026 marks milestone anniversaries for two transformative moments in spaceflight: the 45th anniversary of Space Shuttle Columbia’s maiden voyage and the 10th anniversary of SpaceX’s first successful rocket landing at sea. Though separated by 35 years, both events represent bold attempts to solve the same fundamental challenge—making space access economically sustainable through reusability. Comparing these milestones reveals how dramatically systems engineering philosophy and practice have evolved.

STS-1: The Riskiest First Flight in NASA’s Crewed Spaceflight History

On April 12, 1981—coincidentally, exactly twenty years after Yuri Gagarin became the first human in space—Commander John Young and Pilot Robert Crippen launched aboard Columbia from Kennedy Space Center’s Pad 39A. The original April 10 launch had been scrubbed due to a computer timing problem; technical readiness, not symbolism, determined the schedule. What made STS-1 extraordinary was not just that it inaugurated a new spacecraft, but that no uncrewed orbital test flight preceded it. Every previous American spacecraft—Mercury, Gemini, and Apollo—had flown uncrewed orbital missions before carrying astronauts. Columbia’s crew was flying a human-rated system that had never been tested in its full operational configuration in orbit.

The Space Shuttle represented an unprecedented integration challenge. The system combined a reusable orbiter with an expendable external tank and recoverable solid rocket boosters—three different propulsion systems that had to work in concert. Columbia spent 610 days in processing, 35 days in the Vehicle Assembly Building, and 105 days on the launch pad before finally lifting off. Young rejected a NASA proposal to use the first flight as a Return to Launch Site (RTLS) abort test—a scenario in which the orbiter would reverse course during ascent and fly back to the launch site. He called it “Russian roulette,” judging the RTLS maneuver too dangerous to attempt on a first flight. Engineers identified roughly 70 anomalies during and after the flight, including a body flap bent far beyond predictions by an overpressure wave generated during SRB ignition—damage that could have made controlled reentry impossible.

Over its 30-year operational life, the Shuttle program would go on to fly 135 missions, construct the International Space Station, deploy and service the Hubble Space Telescope, and generate an enormous body of engineering knowledge that directly informed the design of commercial crew

vehicles. Those achievements, hard-won and sometimes tragic, are part of the legacy that began with STS-1.

CRS-8: Landing at Sea

On April 8, 2016, SpaceX launched a Falcon 9 rocket carrying a Dragon cargo spacecraft to the International Space Station. Nine minutes after liftoff, the first stage descended through the atmosphere, executed a series of engine burns, and landed vertically on the autonomous drone ship *Of Course I Still Love You*, stationed 300 kilometers offshore in the Atlantic Ocean. It was the first successful drone ship landing after multiple prior attempts had ended in explosions on the deck.

The achievement represented a fundamentally different approach to reusability. Where the Shuttle required extensive refurbishment between flights—driving per-mission costs that ultimately exceeded those of expendable rockets—SpaceX designed the Falcon 9 for rapid turnaround. The recovered first stage, designated B1021, was refurbished and flew again in March 2017, proving the economic thesis that propulsive landing could enable cost-effective reuse.

Critically, the entire landing development program was conducted without risking human life. The primary mission—delivering cargo to the ISS—was complete before the first stage ever attempted its landing. If the booster crashed, as it did on four prior attempts, the payload was already safely on its way. SpaceX could afford to lose as many boosters as necessary to learn, iterating with hardware rather than simulations, because no crew was aboard. This stands in stark contrast to STS-1, where the vehicle was human-rated and crew-occupied from first flight—Young and Crippen had to ride the system they were testing.

How Systems Engineering Evolved

Development Philosophy: The Shuttle emerged from a traditional aerospace development model—extensive upfront analysis, formal requirements documents, and sequential phase gates. Development took over a decade. SpaceX embraced iterative development with rapid hardware testing. The Falcon 9 landing capability evolved through sixteen test flights from 2013 to 2016, with engineers learning from each failure. Four drone ship landing attempts ended in explosions before the April 2016 success—each providing data that informed the next iteration.

Test Philosophy: STS-1 exemplified a “fly-before-you-fully-understand” confidence born of Apollo-era experience. The Shuttle was a crewed vehicle from its very first orbital flight—there was no uncrewed dress rehearsal, and every test carried human lives. SpaceX inverted this approach: test early, test often, and let hardware failures teach you what simulations cannot. The company’s willingness to lose boosters during development reflected a calculated risk trade made possible by a crucial architectural decision—the landing attempt was decoupled from the payload delivery mission, so failures during landing experiments never jeopardized the primary objective or any crew.

Requirements Governance: The Shuttle’s design was shaped by competing requirements from NASA, the U.S. Air Force, and political stakeholders. Air Force cross-range requirements drove the orbiter’s delta-wing design; payload bay dimensions were negotiated across agencies; workforce distribution reflected political realities. These compromises increased system complexity, weight, and cost. SpaceX, as an integrated commercial entity, defined its own requirements and optimized for a narrower set of objectives—primarily cost-effective access to orbit. This difference in requirements governance profoundly influenced the resulting architectures and illustrates why the SE community treats requirements management as a make-or-break discipline.

Autonomy and Software: Columbia’s landing was entirely manual—Young piloted the unpowered orbiter to a runway touchdown at Edwards Air Force Base, because the human-rated vehicle required a human pilot. The Falcon 9 landing was fully autonomous, executed by onboard computers with no real-time human input possible given communication latencies—and no human aboard to be at risk. The

shift reflects both advances in computational capability and a fundamental change in how engineers allocate functions between humans and machines.

Architecture for Reuse: The Shuttle's thermal protection system required inspection and repair of thousands of tiles between flights. Its main engines needed extensive refurbishment. SpaceX designed the Falcon 9 with reuse as a primary requirement from the outset—propellant margins for landing burns, robust landing legs, and engines designed for multiple flights without disassembly. This "design for operations" thinking has become central to modern SE practice.

SE Lessons for Today

Iteration Speed Matters—When You Can Decouple Risk: SpaceX's ability to fly, fail, learn, and fly again within months—rather than years—compressed the learning cycle dramatically. But this was not mere recklessness: it was enabled by an architectural decision to separate the experimental objective (booster recovery) from the operational mission (payload delivery). The booster landing attempt occurred only after the payload was safely on its way. This risk partitioning is the SE insight—"fail fast" is a sound strategy only when the failure boundary is clearly defined and the consequences are contained. Systems engineers should ask not just "can we iterate faster?" but "have we structured the system so that experimental failures don't cascade into operational ones?"

Operational Cost Drives Architecture: The Shuttle achieved technical reusability but not economic reusability—per-mission costs ultimately exceeded those of building new expendable rockets. SpaceX's architecture decisions prioritized operational simplicity and rapid turnaround, even at the cost of some performance.

Human Rating Changes Everything: The Shuttle had to work the first time with crew aboard. Every STS-1 system carried the weight of human-rating requirements: redundancy, abort modes, life support, and the inability to iterate through destructive failures. SpaceX could blow up boosters on a barge and call it data. This is not a criticism of either approach—it is a reminder that the presence or absence of crew fundamentally reshapes the trade space available to systems engineers. Risk tolerance, test philosophy, development timelines, and cost structures all change when human lives are in the loop.

Both Approaches Required Courage: Young and Crippen flew knowing that many failure modes had never been tested and that their vehicle's only abort options were largely theoretical. SpaceX accepted very public failures—explosions broadcast live—as the price of rapid iteration. Different eras demanded different forms of boldness, but both pushed the boundaries of what systems engineering could achieve.

Today, as SpaceX routinely lands and reflies boosters—surpassing 400 drone ship landings in August 2025—and as the company attempts full Starship reusability, the lessons of both eras remain relevant. The Shuttle proved that reusable spacecraft were technically feasible and went on to build the infrastructure of the space station era; the Falcon 9 proved they could be economically practical. Together, these April milestones chart the evolution of systems engineering from an era of monumental government programs to one of rapid commercial iteration—and point toward a future where space access becomes truly routine.

References

NASA STS-1 Mission Overview: nasa.gov/mission/sts-1

NASA: 40 Years Ago—Columbia Takes Flight: nasa.gov/history/40-years-ago-columbia-takes-flight

SpaceX CRS-8 Drone Ship Landing: spaceflightnow.com

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Smithsonian: The First Space Shuttle—40 Years Since STS-1: airandspace.si.edu

This article was drafted with assistance from Claude.ai by Anthropic.

INCOSE Michigan Chapter

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