INCOSE Michigan Chapter

Monthly Newsletter

October 2026

In This Issue

- President's Message
- Chapter News
- Upcoming Events Calendar
- Upcoming Chapter Events
- Partner Organization Events
- Other INCOSE Chapter Events
- Other Events
- Historical Corner

President's Message

September was busy! We started out with an Engineering Expedition to *SCORE: Sports by Design* at the Metropolitan Museum of Design Detroit (it was great to meet Ozzy Weli there). Our certification information session was held on the 15th (thanks to Karl Selewski for presenting) and we visited the MRover University Rover Challenge team. We met them at the Ford Robotics Building to present their award from the INCOSE Foundation and then toured the impressive Wilson Student Team Project Center. The team and a number of INCOSE Michigan members then relocated to our second Systems Soirée at the Kensington Hotel/Relish. Finally, I reprised the Certification presentation for the Colorado Front Range Chapter on September 29th; that drew the month to a close.

October has our Sidequest Social (An Idiot's Guide to Wine) on October 3rd, our multi-chapter joint meeting (Xavi Bou's *Ornithographies: Making the Invisible Choreography of Flight Visible*), and a Lockheed Martin presentation on SysML v2 requirements. Other chapters and our partners also have many offerings worth your attention; see below.

October's Historical Corner is a double feature: Fermi 1 and Schiaparelli.

INCOSE is requiring us to update our bylaws; we will be including our proposed revisions in our election cycle this year. We are proposing a number of changes (the last update was in 2009!) to reflect changes in INCOSE policy and changes in operating practices while maintaining the intent and spirit of the original bylaws. Please vote!

We will be sending out a poll to solicit your input on our end-of-year social. Please respond!

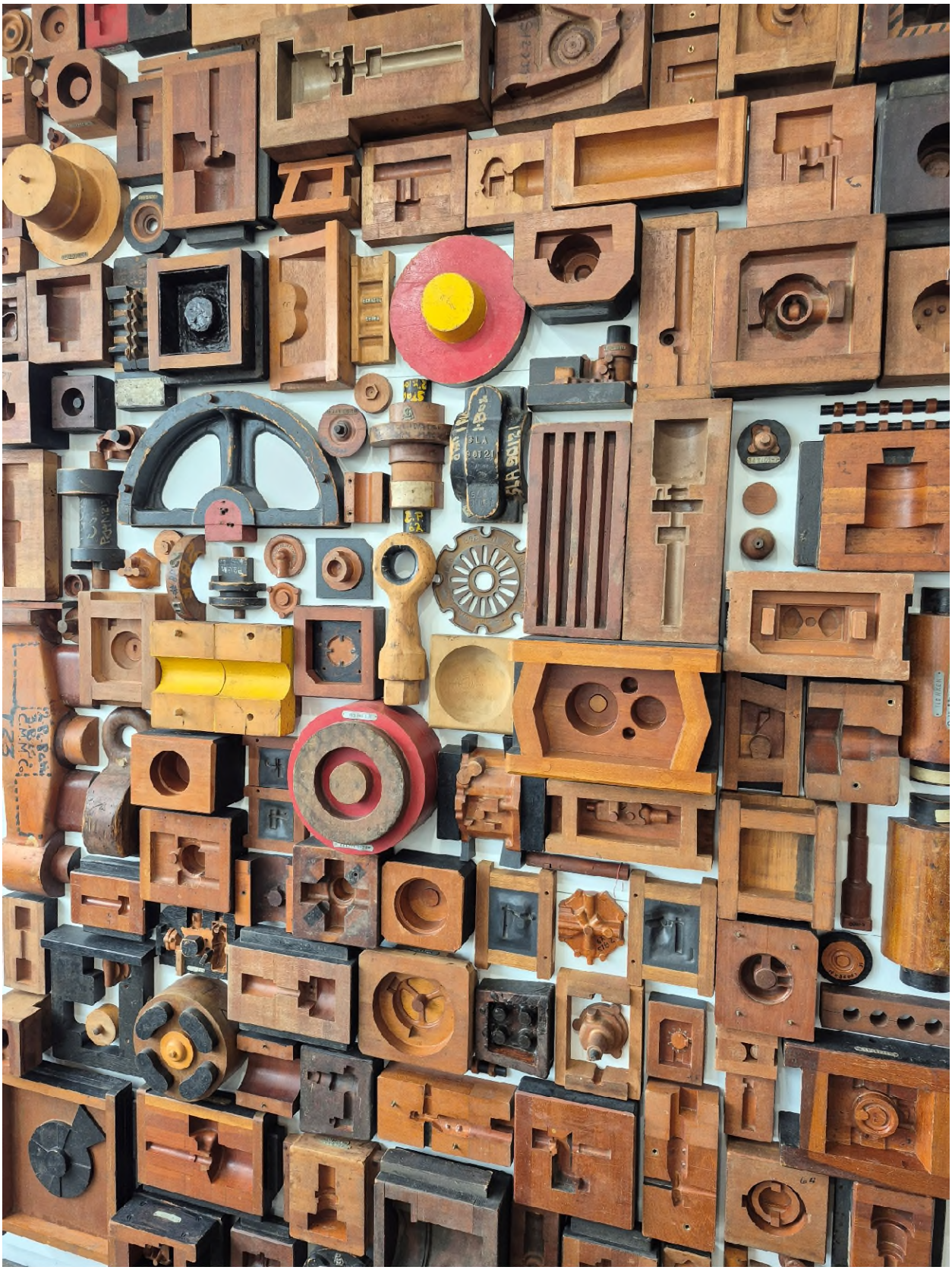
Michael J. Vinarcik, ESEP-Acq, P.E., FESD
President



Ozzy Weli, Leslie Ann Pilling (Founder/President, Metropolitan Museum of Design Detroit), and Michael Vinarcik, ESEP-Acq (INCOSE Michigan President)



Non-partisan displays as part of the *SCORE: Sports by Design* exhibit



Alan Kaniarz's *Pattern Recognition*
(Constructed from wooden foundry patterns)





Michael J. Vinarcik, ESEP-Acq (INCOSE Michigan President / INCOSE Foundation Treasurer) with the University of Michigan MRover team (INCOSE Foundation Systems Engineering Excellence Award)

Upcoming Events Calendar

Date	Event	Organization
October 3	Sidequest Social: An Idiot's Guide to Wine	INCOSE Michigan Chapter
October 7	SE Lab Demo Day: The Self-Building Model	INCOSE
October 12-15	The Battery Show	Informa North America
October 13	AI Won't Fix a Broken Workflow	INCOSE Los Angeles Chapter
October 15	Michigan Cyber Summit	Engineering Society of Detroit
October 15	Engineering Process Quality (EPQ) Webinar	INCOSE
October 15	Lunch & Learn	PMI Great Lakes Chapter
October 15	LIFT Facility Tour	ASM International Detroit Chapter
October 15	Pontiac Transportation Museum Tour	SAE International Detroit Section
October 20	Ornithographies: Making the Invisible Choreography of Flight Visible	INCOSE Michigan Chapter (in partnership with NORSEC (Norway), Blues, Colorado Front Range, Enchantment, and Midwest Gateway Chapters)
October 20	Leveraging SysML v2 and Cameo to Realize True Model-Based Requirements	INCOSE Michigan Chapter
October 21-24	PMI Global Summit 2026 “Built to Move”	PMI
October 22	SupplyMind	INCOSE Philadelphia Chapter
October 24	Beyond the Basics MBSE Tutorial: Fun and Interesting Applications of SysML and CATIA Magic	INCOSE Los Angeles Chapter
October 28	ENX Supplier Security Symposium	ENX Association
October 29	Engineers Get Hired Job Fair	Engineering Society of Detroit
November 4	SE Lab Demo: Lean MBSE with iQUAVIS	INCOSE
November 7-8	LA–SD Joint Technical Conference (Hybrid)	INCOSE Los Angeles & San Diego Chapters
November 9	Lunch & Learn	PMI Great Lakes Chapter
November 11	Scalable Qualification Architectures Commensurate with Verification Activity Complexity	INCOSE Enchantment Chapter
November 11	Parade Company Studio Tour	SAE International Detroit Section
November 17	Systems Architecture for the Electrical, Electronics, and Software (E/E&S) Disciplines	INCOSE Michigan Chapter
November 17-19	SysML v2 3-Day Intensive Bootcamp	INCOSE North Texas Chapter
December 2	Stahls Motors & Music Tour	SAE International Detroit Section
December 4	TechCentury Student Writing Contest deadline	Engineering Society of Detroit

Upcoming Chapter Events

Sidequest Social: An Idiot's Guide to Wine

Date: Saturday, October 3, 2026, 6:00 PM Eastern

Location: Epiphany 313, 10103 Kercheval Avenue, Detroit, MI 48214

Cost: Varies (General Admission and Front Row tickets available)

Join your fellow chapter members for an evening that pairs hilarious stand-up comedy with a curated tasting of six wine varietals from around the world. The Australian smash-hit *An Idiot's Guide to Wine* has arrived in Detroit, delivering a rare blend of laughter and learning—whether you're a seasoned connoisseur or a complete beginner.

Why This Event?

The show was written by Merrick Watts, the only comedian in the world to hold a WSET (Wine & Spirit Education Trust) Level 3 qualification—a reminder that domain expertise and audience engagement aren't mutually exclusive. Systems engineers will appreciate the underlying challenge: distilling a complex, technical subject (wine) into an accessible, repeatable experience that lands consistently for a diverse audience. It's requirements decomposition and stakeholder communication, served by the glass.

This is a relaxed, social evening at the same Kercheval Avenue venue that hosted our Dungeon Cocktail Experience earlier this year—an ideal setting for members and guests to mingle.

Details:

- Age: 21+ with valid ID
- Language: English, performed by a local comedian
- Accessibility: Venue is ADA accessible
- Note: Alcohol consumption is voluntary; non-alcoholic options available for an additional fee
- Tickets: Reserve your own at https://feverup.com/m/667936

RSVP: Contact michael.vinarcik@incose.net if you plan to attend (we may coordinate dinner reservations if there is sufficient interest).

Ornithographies: Making the Invisible Choreography of Flight Visible

Date: Tuesday, October 20, 2026, 12:00–1:00 PM Eastern

Location: Virtual

Cost: Free



The INCOSE Michigan Chapter is pleased to host visual artist Xavi Bou for a remote presentation, jointly sponsored with the INCOSE NORSEC (Norway), Midwest Gateway, Blues, Colorado Front Range, and Enchantment Chapters. Because the six chapters are underwriting the event together, attendance is free and open to all INCOSE members and other interested individuals.

About the Talk

Since 2012, Xavi Bou has been photographing what the eye cannot hold. Using a contemporary form of chronophotography developed in his own practice, he captures sequences of birds in flight and assembles them into single images, revealing trajectories, flight patterns, and natural choreographies that ordinary sight cannot resolve. The resulting photographs do not freeze a moment; they condense an expanded stretch of time into one readable frame. His projects *Ornithographies*, *Entomographies*, and *Fluctus* have been exhibited in contemporary art centers, international photography festivals, and natural science museums, and his work is currently on view at the Dennos Museum Center in Traverse City, Michigan.

For this audience, Mr. Bou will give particular attention to collective behavior — the starling murmurations in which thousands of individuals produce a coherent global form with no leader and no central plan, and in which that form reorganizes in seconds around an approaching predator. He will also discuss the development of the capture system itself: the requirements that drove it, the camera and software work needed to realize it, and the approaches that did not survive contact with the problem.

The themes run close to the center of systems engineering practice:

- Emergence — properties that exist only in the interaction of parts within a wider whole, which is both his subject and the opening definition of our discipline.
- Distributed control — global structure arising from local rules without a central controller, the governing question in multi-agent systems and autonomous fleets.
- System and environment — behavior that cannot be characterized apart from the context acting on it.
- Representation — rendering time-extended behavior in a single legible image, a problem our modeling tools handle poorly.

This is not a systems engineering lecture, and it has deliberately not been reframed as one. Its value lies in seeing our central abstraction through entirely different eyes.

About Xavi Bou

Xavi Bou (Barcelona, 1979) is a visual artist whose work questions how nature is represented. Rather than treating animals as fixed subjects, he proposes movement itself as a means of representation, developing a distinctive visual language that joins artistic inquiry with scientific observation.

His interest in the natural world began in childhood, on long walks through the Llobregat Delta with his grandfather, who passed on a love of birds and the environment. That landscape carried a stark contrast: in the late 1980s it ranked among the most industrialized and polluted regions in Europe, with textile factories discharging waste directly into the river. The experience of a nature visibly scarred by unchecked development shaped an environmental awareness that was both early and unsentimental, and left him seeking in the complexity of the living world a motivation for a more sustainable relationship with the planet.

Trained in geology and photography, he has developed the Ornithographies project since 2012. The series has drawn wide international attention across general, specialized, scientific, and cultural publications, positioning the work in a hybrid space between art, science, and environmental communication, and leading to books, exhibitions, and the later projects Fluctus and Entomographies.

Presented By

Hosted by the INCOSE Michigan Chapter, with the support of the INCOSE NORSEC (Norway), Midwest Gateway, Blues (Alabama), Colorado Front Range, and Enchantment (New Mexico) Chapters. Joint sponsorship keeps registration free for all attendees and brings a genuinely international audience to a single session.

Register: https://events.teams.microsoft.com/event/a369c0a4-92aa-4677-87b7-2de20bdf4f5e@3523a793-0e50-4646-b80b-25d83bd7f296

Leveraging SysML v2 and Cameo to Realize True Model-Based Requirements

Date: Tuesday, October 20, 2026, 6:00–7:00 PM Eastern

Location: Virtual

Cost: Free

About the Talk

Industry has long desired seamless traceability between requirements, architecture, and verification models. Unfortunately, many efforts to establish requirements management models have historically relied on creation of hierarchical documents - an approach which impedes reuse of requirements and hinders automated analysis of system designs relative to the requirements. Early investigations with the SysML v2 plugin in Cameo Systems Modeler 2026x show that Systems Engineers can finally leave the document-centric paradigm in the past by implementing requirements reuse mechanisms and reimagining how requirements are structured, including the use of parameterized constraints. Implementing such an approach to requirements definition enables early-stage verification of requirements. Attendees will gain insight on deploying the expressive power of SysML v2 to attain a more integrated system model with traceability between the requirements and the architectural design.

About Brett Hudson

Brett Hudson is a Systems Architect Principal at Lockheed Martin with over 20 years of experience designing and verifying complex defense systems. His current focus is on implementing MBSE methodologies to develop and deploy reusable resources for the engineering workforce. Brett holds a MS in Systems Engineering from Southern Methodist University and has attained the OMG SysML Model Builder Intermediate (MBI) and OMG SysML v2 Model User (MU) certifications.

Register: https://lp.constantcontactpages.com/ev/reg/5r4dffz/lp/1522d87e-14d4-4556-8c0e-7775d91fbc03

Systems Architecture for the Electrical, Electronics, and Software (E/E&S) Disciplines

Date: Tuesday, November 17, 2026, 12:00–1:00 PM Eastern

Location: Virtual

Cost: Free

About the Talk

The integration of Electrical, Electronics, and Software (E/E&S) architectures has become a critical component in managing product complexity, while enabling seamless collaboration across engineering teams. CATIA Magic continues to provide value for Enterprise Architects, Systems Architects, and now E/E Architects with the CATIA Magic Systems Electrical/Electronics & Software (EE&S) Architect Plug-in, a solution created to synthesize the Hardware, Software, and Network Communication point of views, conveying design intent to discipline specific implementation engineers. This presentation will focus on how a Model-Based Systems Engineering (MBSE) approach to E/E activities helps deliver optimized architectural proposals to multidisciplinary development teams, guiding further activities in their respective domains, and ensuring implementations meet customer requirements.

About Erick Richardson

Erick Richardson is a Systems Engineering Consultant at Dassault Systèmes with over 20 years of experience across Aerospace, Industrial, and Consumer industries. Erick holds a Degree in Electrical Engineering from Missouri University of Science & Technology, and Certificates in Systems Engineering, Model-Based Systems Engineering (MBSE), Cyber Security, and Systems Thinking from California Institute of Technology, Saint Louis University, and Cornell University. Erick is also an International Council on Systems Engineering (INCOSE) Certified Systems Engineering Professional (CSEP). At Dassault Systèmes, Erick guides customers in building Virtual Twins of Systems, specializing in applying MBSE, creating Electrical / Electronics (E/E) Architecture, and developing Software Defined Products.

Register: https://lp.constantcontactpages.com/ev/reg/4bgdmp6/lp/3187ac14-2bb4-4a96-bae3-a93ea9d059a4

Partner Organization Events

ASM International Detroit Chapter

Facility Tour: LIFT Innovation Institute, Detroit

Date: Thursday, October 15, 2026, 4:00–6:00 PM Eastern

Location: LIFT Headquarters, 1400 Rosa Parks Boulevard, Detroit, MI 48216

Cost: $20 for dinner, paid on arrival

LIFT is one of the nation's manufacturing innovation institutes: a Detroit-based public-private partnership that develops and tests advanced materials, manufacturing processes, and training curricula for industry and the Department of War, and it names systems engineering alongside materials, processes, and talent as one of its core areas of expertise. Its Detroit High Bay is a full-scale pilot facility where new materials, processes, and systems are designed, built, and tested, and its Advanced Metallics Production & Processing (AMPP) Center bridges alloy R&D and pilot-scale

production. For members, it is a rare look at technology maturation in practice — the "valley of death" between laboratory concept and production adoption that every program has to cross. The tour concludes with a catered dinner from Slows Bar BQ. Preregistration is required, and facility tours cap on headcount, so reserve early.

Register: Preregistration required by email to asmdetroitchapter@gmail.com ·
Event page: https://asmdetroitchapter.memberplanet.com/v2app/#/event/asmdetroitchapter/lifttour

Engineering Society of Detroit (ESD)

Michigan Cyber Summit 2026

Date: Thursday, October 15, 2026, 8:00 AM–5:00 PM Eastern

Location: Vibe Credit Union Showplace, 46100 Grand River Ave., Novi, MI 48374

Cost: $95 industry, $80 government and nonprofit, $50 college students; lunch and snacks included

Security is an emergent system property. It cannot be bolted onto a single component after the fact. Now in its 15th year, this state-hosted summit brings cybersecurity experts from across the country to cover the strategies, technologies, and partnerships behind Michigan's cyber defense. It is open to the public. For parents and educators: DTMB's High School Cyber Summit runs the day before (October 14) as a half-day program for students, with registration at $35.

Register: https://events.govtech.com/Michigan-Cyber-Summit

Call for Mentors: Michigan Regional Future City Competition

Date: Mentoring now through January; competition Tuesday, January 19, 2027

Location: Participating schools (in-person or virtual); competition at Vibe Credit Union Showplace, Novi

Future City asks teams of 6th–8th graders to do what our members do every day. They take an open-ended problem, set requirements, make trade-offs, and defend a design before judges. This year's theme, "Fire Resilient Future," has students designing cities that prevent, withstand, and recover from fires, which is a resilience problem well suited to systems thinking. Teams produce a 1,500-word essay, a scale model built from recycled materials, a project plan, and a live presentation. Mentors help students brainstorm, answer questions, and give feedback drawn from real engineering experience.

Schools currently seeking mentors:

- Bates Middle School (Detroit): 28 students, 2–3 teams; virtual via Zoom or Teams, 2:50–3:40 PM
- Bryant Middle School (Dearborn): 2 teams; Wednesdays, 7:15–8:15 AM
- Detroit Country Day School (Beverly Hills): 37 seventh graders, about 12 teams; mid-September through December, 2–3 classes per week on a rotating 8:30 AM–3:00 PM schedule. Classes run back-to-back, so one visit can cover both.
- Madison Carver Cornerstone Academy (Detroit): 3 teams; Fridays, with 8th grade the priority at 11:40 AM–12:25 PM
- Ypsilanti Connected Community School: first year in the program; virtual, or in person Thursdays and Fridays

Employers can also sponsor hands-on activity stations on competition day. These serve the students who attend but are not on the presenting team.

Contact: Allison Marrs, Future City Program Manager, amarrs@esd.org,
248-353-0735 ext. 121 | esd.org/futurecity

Engineers Get Hired Job Fair

Date: Thursday, October 29, 2026, 2:00 PM–7:00 PM Eastern

Location: Vibe Credit Union Showplace, 46100 Grand River Avenue, Novi, MI 48374

Cost: Free to ESD members; Non-ESD members $20 through October 15, $25 after

ESD's fall job fair regularly draws hundreds of engineers and technology professionals, with past employers including Ford, General Dynamics Land Systems, Dürr Systems, Ghafari, LG Energy Solution and MDOT. It is worth attending as a hiring manager as much as a candidate, and non-member registration includes a one-year ESD membership for first-time members. Job seekers can also post a resume to the ESD Job Bank at no charge.

Register at: https://www.esd.org/gethired/

9th Annual TechCentury Student Writing Contest

Deadline: Friday, December 4, 2026

Eligibility: Students at Michigan universities studying engineering or a related field

Prize: The top three entries will be published in the Spring 2027 TechCentury. First place receives a $1,000 scholarship sponsored by Fishman Stewart, LLC.

Requirements, trade studies, and design rationale all depend on clear writing, and this contest rewards students who can explain engineering to a broad audience. Please share it with students you mentor, teach, or supervise as interns.

Contact: Susan Thwing, sthwing@esd.org

SAE International Detroit Section

Pontiac Transportation Museum Tour

Date: Thursday, October 15, 2026, 5:30–8:00 PM Eastern (registration 5:30, tour 6:00)

Location: Pontiac Transportation Museum, 250 W Pike St, Pontiac, MI 48341

Cost: $25

A collection of more than 70 cars, trucks, and specialty vehicles designed or built in metro Detroit, tracing Pontiac's path from manufacturing hub to modern transportation milestones — a chance to read vehicle design as a record of the constraints each generation of engineers worked under. Open to SAE members and guests ages 10 and up; registration and refunds close Thursday, October 8, or earlier if it sells out. SAE Detroit accepts "INCOSE" as a member ID for member pricing. Tours cap on headcount, so register early.

Register: https://www.sae-detroit.org/event-details/?id=500

The Parade Company Detroit Studio Tour

Date: Wednesday, November 11, 2026, 4:30–6:00 PM Eastern (networking 4:30, tour 5:00)

Location: The Parade Company, 9500 Mt. Elliott, Studio A, Detroit, MI 48211

Cost: $25

A behind-the-scenes look at how America's Thanksgiving Parade is designed and built: roughly 200,000 square feet of floats, the world's largest collection of papier-mâché heads, and a costume shop producing more than 3,000 costumes on site. Every float is a one-off build against a fixed, very public

deadline. Open to SAE members and guests ages 8 and up; registration closes November 10 and refunds November 5. Family-friendly.

Register: https://www.sae-detroit.org/event-details/?id=498

Stahls Motors & Music Experience Tour

Date: Wednesday, December 2, 2026, 5:30–7:30 PM Eastern

Location: Stahls Motors & Music Experience, 56516 N Bay Dr, New Baltimore, MI 48051

Cost: $25

Vehicles from the Brass, Depression, and Art Deco eras alongside automated musical instruments, including the Mighty Wurlitzer theatre organ.

Register: https://www.sae-detroit.org/event-details/?id=502

PMI Great Lakes Chapter

Lunch & Learn (Recurring, Virtual)

Date: Thursday, October 15 and Monday, November 9, 2026, 12:00–1:00 PM Eastern

Format: Virtual

Cost: $15 members / $20 non-members

PMI Great Lakes' monthly virtual lunch session earns 1.0 PDU. Online registration closes at noon the Tuesday before each session; topics and speakers have not yet been announced. Under the INCOSE–PMI MOU, these hour-long sessions are the lowest-cost way for members to build cross-discipline depth.

Register: https://pmiglc.org/calendar?eventId=44985 (October) · https://pmiglc.org/calendar?eventId=44986 (November)

PMI Global Summit 2026 Comes to Detroit — "Built to Move"

Date: October 21–24, 2026

Location: Huntington Place Convention Center, 1 Washington Blvd., Detroit, MI 48226

Cost: See registration page

PMI's flagship annual conference, the Global Summit, lands in Detroit this October, putting a premier project-management event right in our members' backyard. This year's theme, "Built to Move," centers on navigating accelerating change—choosing agility over rigidity, shaping what comes next, and equipping professionals to stay relevant as the pace of work increases. For INCOSE Michigan members, it's a strong cross-discipline development opportunity under the INCOSE–PMI MOU, and a rare chance to attend a global-scale program without travel. The Summit also runs alongside PMI's Leadership Institute Meeting (LIM), which focuses on leadership training, PMI strategy, and collaborative breakout sessions for chapter leaders.

Register at: https://events.pmi.org/flow/pmi/gsdetroit26/landing/page/registration

Other INCOSE Chapter Events

SE Lab Demo Day: The Self-Building Model — Live AI Workflows for the Next Era of MBSE in SysML v2

Date: Wednesday, October 7, 2026, 11:00 AM–12:00 PM Eastern

Format: Virtual

Cost: Free

The session argues that the effort of building models by hand, more than any doubt about their value, keeps most hardware teams on documents and spreadsheets, and shows how the Dalus MBSE platform addresses that. A natural follow-on to the chapter's SysModeler.ai session and this year's SysML v2 programming.

Register: https://www.incose.org/event/incose-se-lab-demo-day-the-self-building-model-live-ai-workflows-for-the-next-era-of-mbse-in-sysml-v2/

INCOSE Los Angeles Chapter: AI Won't Fix a Broken Workflow — The Systems Engineer's Role in Healthcare's AI Transformation

Date: Tuesday, October 13, 2026, 5:30–7:30 PM Pacific / 8:30–10:30 PM Eastern

Format: Virtual

Cost: Free

Healthcare is one of the most complex systems society operates, and AI is arriving faster than the workflows and organizations around it can absorb. David Quam MD, a family physician of nearly 30 years, examines where the systems engineer fits. The point applies well beyond medicine: automating a broken process speeds up the failure.

Register: https://los-angeles.incose.org/event/incose-los-angeles-chapter-ai-wont-fix-a-broken-workflow-the-systems-engineers-role-in-healthcares-ai-transformation/

Engineering Process Quality (EPQ): Its Values and Supporting Ethics

Date: Thursday, October 15, 2026, 11:00 AM Eastern

Format: Virtual

Cost: Free

QMI co-founded INCOSE's Systems Engineering Quality Management Working Group and now partners with INCOSE on individual and corporate training. This webinar introduces the curriculum behind the Systems Engineering Quality Manager (SEQM) program — well suited to members who own process, audit, or quality responsibilities within an SE organization.

Register: https://www.incose.org/event/exclusive-to-cab-members-engineering-process-quality-epq-its-values-and-supporting-ethics/

INCOSE Philadelphia Chapter: SupplyMind — Using Your Own Issue History, SOPs, and AI to Resolve Problems Before They Escalate

Date: Thursday, October 22, 2026, 6:00 PM–9:00 PM Eastern

Location: Virtual

Cost: Free

Liang Zhang, Assistant Teaching Professor at Drexel, presents a talk and training session on using an organization's own issue history and procedures to catch problems early — a direct connection to

lessons-learned practice, one of the most underused feedback paths in any SE lifecycle. Registration closes October 10.

Register: https://philadelphia.incose.org/event/incose-philadelphia-chapter-supplymind-using-your-own-issue-history-sops-and-ai-to-resolve-problems-before-they-escalate/

INCOSE Los Angeles Chapter: Beyond the Basics MBSE Tutorial: Fun and Interesting Applications of SysML and CATIA Magic

Date: Saturday, October 24, 2026, 8:00 AM–12:30 PM Pacific / 11:00 AM–3:30 PM Eastern

Format: Virtual

Cost: $25 members, $50 non-members

SysML and CATIA Magic are capable of far more than most of us ever get to explore. Whether you're building your first models or have been modeling for years, there's a good chance some of the most useful features are still waiting to be discovered. This tutorial is a chance to uncover them together.

During this session, we'll take a hands-on, practitioner-led tour of lesser-known capabilities that make models clearer, more powerful, and more enjoyable to build. No matter where you're starting from, you'll leave with fresh ideas, new confidence, and techniques you can put to work right away.

Register: https://lp.constantcontactpages.com/ev/reg/td5m5pj

SE Lab Demo: Lean MBSE with iQUAVIS

Date: Wednesday, November 4, 2026, 10:00 AM Eastern

Format: Virtual

Cost: Free

Matthias Greinert gives an accessible introduction to MBSE and a live demonstration of how iQUAVIS supports systems engineering throughout development. A good entry point for members new to modeling, or anyone weighing lighter-weight tooling.

Register: https://www.incose.org/event/se-lab-demo-lean-mbse-with-iquavis/

INCOSE Los Angeles & San Diego Chapters: 2026 Joint Technical Conference

Date: Saturday–Sunday, November 7–8, 2026, from 9:00 AM Pacific

Location: Caltech, Pasadena, CA

Format: Hybrid

Cost: $99

A two-day technical conference hosted jointly by two of the largest West Coast chapters, with remote attendance available — the largest sister-chapter program this fall that Michigan members can join without travel.

Register: https://los-angeles.incose.org/event/2026-incose-la-sd-chapters-hybrid-2-day-joint-technical-conference/

INCOSE Enchantment Chapter: Scalable Qualification Architectures Commensurate with Verification Activity Complexity

Date: Wednesday, November 11, 2026, 4:45–6:00 PM Mountain / 6:45–8:00 PM Eastern

Format: Virtual (invitation by request)

Cost: Free

How much SE rigor does a given verification effort actually warrant? The talk takes the position that the scope of SE implementation must itself be managed and scaled, just as system scope is — useful for anyone who has watched a qualification program either under-reach or drown in its own process. Request the meeting invitation through the event page.

Register: https://enchantment.incose.org/event/scalable-qualification-architectures-commensurate-with-verification-activity-complexity/

INCOSE North Texas Chapter and Dassault Systèmes: SysML v2 3-Day Intensive Bootcamp

Date: Tuesday–Thursday, November 17–19, 2026, 9:00 AM–5:00 PM Central

Format: In-person, North Texas

Cost: Free; seats limited

Covers the three pillars of MBSE — language, tool, and methodology — through lectures, demonstrations, and hands-on work. Listed for members who travel to the Dallas area; for everyone else, a useful benchmark for what a structured SysML v2 curriculum looks like.

Register: https://north-texas.incose.org/event/north-texas-chapter-and-dassault-systemes-sysml-v2-3-day-intensive-bootcamp-2026/

Other Events

The Battery Show North America

Date: Monday–Thursday, October 12–15, 2026

Location: Huntington Place, 1 Washington Blvd., Detroit, MI 48226

Cost: See website for pass options

A modern battery pack is a textbook integration problem: cell chemistry, thermal management, battery-management software, and charging infrastructure all have to work as one system. The show expects more than 16,000 attendees, 1,300+ exhibitors, and 140+ hours of education across four days — a practical way to see how suppliers are solving interface and verification challenges across the EV value chain.

Register: https://www.thebatteryshow.com/

ENX Supplier Security Symposium

Date: Wednesday, October 28, 2026

Location: Vibe Credit Union Showplace, 46100 Grand River Avenue, Novi, MI 48374

Cost: Free

Security requirements now flow down the automotive supply chain like any other interface requirement, and suppliers are expected to demonstrate compliance. The symposium covers what OEMs actually expect from their suppliers and how TISAX practices work in reality, including a panel with Stellantis, Yazaki, and a TISAX audit provider. Aimed at Detroit-area supplier decision-makers and practitioners, including small and mid-sized firms.

Register: https://www.auto-3s.com/

Historical Corner

Two October anniversaries, fifty years apart, and one question underneath both: what happens to the part of a system that falls outside the analysis? At Fermi 1, on the Lake Erie shore south of Detroit, it was a thin zirconium liner added late in the design to make a hypothetical accident less severe. On Mars, it was a timing parameter inside a supplier's inertial measurement unit. In both cases the system reported the trouble before it became a failure, and in both cases the logic reading that report — human operators in 1966, flight software in 2016 — had already decided which source of information to doubt. The columns below take Fermi 1 first, then Schiaparelli.

This Month in SE History: Fermi 1 — The Safety Feature in the Inlet Plenum

October 5, 1966 — Sixty Years

At 3:09 p.m. on Wednesday, October 5, 1966, the radiation monitors in the ventilation exhaust of the Enrico Fermi Atomic Power Plant alarmed and automatically closed their dampers. Monitors in four other areas of the plant were reading high as well. The operators, who had spent the afternoon slowly raising power on the sodium-cooled fast breeder reactor in Monroe County, shut it down. Two fuel subassemblies had partially melted, and two others had overheated. No one was injured, and the Nuclear Regulatory Commission's record states that no abnormal release to the environment occurred. For an audience in southeast Michigan the outline is familiar: the 1975 book *We Almost Lost Detroit*, the song that borrowed its title, and Fermi 2, which still generates power on the same site under a license that runs to 2045. Less familiar is the object at the center of the event, and the reason it was there. It had been installed to make the reactor safer.

That is the engineering problem this column is about. A design change was added late to address a hazard the rest of the design did not cover. The change had failure modes of its own, and those failure modes were present in every hour of normal operation. The hazard it addressed might never occur.

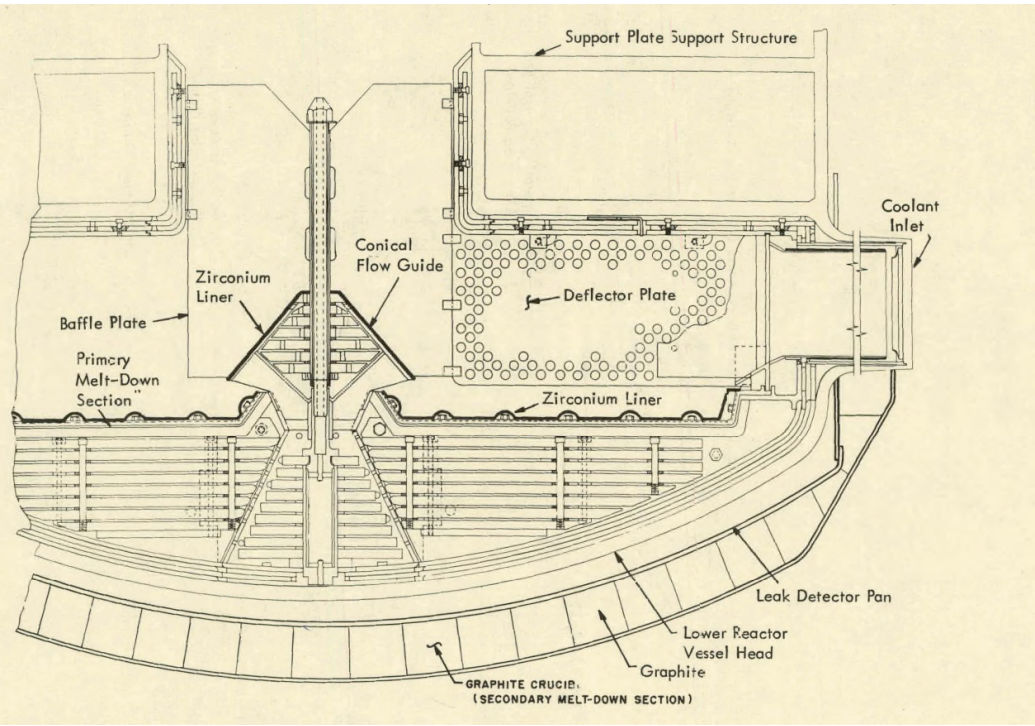


Figure 1. The lower reactor vessel of Fermi 1. Sodium entered at the coolant inlet and turned upward toward the core. The conical flow guide, with its zirconium liner, sat in that turn, directly in the coolant path. (Power Reactor Development Company, 1968, Fig. A.9)

A Prototype Built While the Design Was Still Being Settled

Fermi 1 was the project of the Power Reactor Development Company (PRDC), a consortium led by Detroit Edison's Walker Cisler. Its purpose was to show that a breeder — a reactor that produces more fissile material than it consumes — could be made commercial. Construction began in 1956. Its licensing was contested from the start. Three labor unions challenged the Atomic Energy Commission's provisional construction permit, and the dispute became the first contested licensing proceeding decided under the Atomic Energy Act of 1954. In June 1961 the Supreme Court upheld the permit. The Commission could authorize construction on a finding of reasonable assurance and defer the definitive safety finding to the operating license, provided the final design demonstrated adequate protection before the reactor ran.

That structure meant design questions were still being resolved while the plant was being built. One of them came from the AEC's Advisory Committee on Reactor Safeguards (ACRS), which told the Commission it was not satisfied with the evidence that a supercriticality accident following a meltdown could not breach the containment. Its concern was that molten fuel falling to the bottom of the vessel might collect into a mass that could restart the chain reaction, and it recommended measures to ensure that melted fuel would be distributed in a subcritical arrangement.

The answer, adopted in 1959, was built onto the conical flow guide in the core inlet plenum beneath the core. The guide itself was a stainless-steel cone with six vanes, there to distribute coolant evenly to the core. Its upper surfaces were now covered with six triangular segments of thin zirconium plate. A chronology of the plant's outage ties the segments directly to the ACRS concern, describing them as a way to split a molten mass and keep it subcritical. PRDC's own 1968 report describes their purpose differently: installed together with a zirconium meltdown pan, they were to keep molten fuel from melting through the reactor vessel after a major core meltdown. The two accounts are compatible, but they are not the same, and neither source reconciles them. Zirconium was chosen for its high melting point: the liner was meant to survive contact with molten fuel long enough to do its job.

Six Plates in the Coolant Path

Liquid sodium from three primary loops entered the bottom of the vessel horizontally and was turned upward through the core. The flow guide sat in that turn. Its liner was therefore in the full primary flow during every hour the reactor operated. That is a structural load case, not an accident case.

Each segment was 40 mils thick, hand-formed to the cone, and held by three zirconium machine screws. Two of the six came loose. PRDC's investigators suspected that flow forces made the segments flutter until they broke free of their screws, and that this took a long time to develop: an inspection of the plenum after extensive sodium circulation, before nuclear operation began, had found nothing wrong. One loose segment partially blocked the inlet nozzles of four adjacent subassemblies. Thermal-hydraulic calculations and water tests in a mock-up of the plenum indicated that flow through the two worst-affected subassemblies had fallen to about 3 percent of normal.

The change was justified by what the liner would do in a meltdown. The question critics have pressed since is the one it apparently did not ask: what would the liner do if it came loose in normal flow? Dave Lochbaum of the Union of Concerned Scientists argued that asking that question during the review of the change could have prevented the accident. The irony was sharpened after the event. Before restart, PRDC melted the screw heads with an electric arc and removed the four remaining segments. Its reasoning was that the segments had been provided for an event that could occur only if sodium were completely lost from the reactor vessel, and later analysis of the double-walled primary system and the emergency sodium supply had shown that such a loss was prevented by design.

The Warnings of June and August

The blockage did not arrive without warning. In June 1966, the sodium leaving one subassembly read 20 to 25 percent hotter than its neighbors. In August, during a 60-hour steady run at the 50 percent

power test plateau, some outlets read 40 to 47 percent hotter. After that run the reactor was shut down and four subassemblies were moved to new core positions. The intent was to determine whether the readings reflected real hot spots or faulty thermocouples. PRDC later concluded that the thermocouples had probably been right: it suspected that the second loose segment had been partially blocking other subassemblies before and on October 5, causing the anomalous readings.

That was a sensible diagnostic. The difficulty was what happened while it ran. The reactor was restarted on October 4 with the question still open. Shortly after 3:00 p.m. on October 5, with the reactor at 31 megawatts thermal, about 15 percent of its 200-megawatt first-core rating, the licensed staff member in charge noticed that the control rods were withdrawn about nine inches, where about six would have been normal. He stopped the power increase and had the core outlet temperatures checked; two subassemblies were reading abnormally high. The rod position was later understood as reactivity lost to fuel that had already melted and relocated. By then it was late: PRDC's reconstruction put the onset of melting at 15 to 20 megawatts, and showed a reactivity deficit building from about 6 megawatts that became visible only in the post-incident analysis. At 3:09 p.m. the radiation alarms settled the question.

A fair account notes that the pattern was not new. Lochbaum points out that the Sodium Reactor Experiment in California had followed a closely similar sequence seven years earlier, including high local temperatures attributed to faulty instruments.

More Than a Year to Name the Object

Liquid sodium is opaque, and the core inlet plenum could not simply be inspected. About 40 pounds of fuel, roughly one percent of the total, had melted. In August 1967 the sodium was drained below the inlet plenum, and in September engineers lowered a periscope into the vessel and saw a crumpled, folded piece of sheet metal lying at the outer edge of the plenum. It looked enough like a crushed beer can that the press ran with that description. In January 1968, by matching a model of the folded object against a full-scale mock-up of the plenum, engineers identified it as one of the six zirconium segments; PRDC notified the AEC in February, and the segment was retrieved in March.

The reactor restarted in July 1970, three years and nine months after the event. In November 1972, with the core approaching its burnup limit, PRDC decided to decommission Fermi 1.

How close the region came to disaster remains disputed. Fuller's 1975 book argued that the event could have killed thousands in southeast Michigan. Industry experts dismissed that premise as alarmist, pointing to the plant's safety systems and containment, and in 1976 Detroit Edison published a rebuttal titled *We Did Not Almost Lose Detroit*. The engineering lessons do not depend on settling that argument.

SE Lessons for Practitioners

- **A mitigation is a design change, and it fails like hardware.** The zirconium liner was analyzed for the job it was meant to do in a meltdown. Its own failure modes in normal operation, such as flow-induced flutter at its screws and becoming a loose part in the flow path, are what caused the accident. Every safety feature needs its own failure modes and effects analysis, run against the operating environment it will actually live in.
- **Weigh the always-present cost of a safeguard against its possibly-never benefit.** The liner sat in the full coolant flow for every operating hour. The accident it addressed was later judged not credible. A mitigation that adds continuous exposure to reduce the consequences of a remote event can raise total risk, and the trade deserves an explicit comparison rather than an assumption that more protection is safer.
- **Late changes need the baseline's scrutiny, not less of it.** The liner entered the design in 1959, while construction was underway, answering a reviewer's concern about meltdown. PRDC's own description of it — commercial-grade zirconium sheet 40 mils thick, hand-formed to the cone, split

and spot-welded to fit, and held by three screws per segment — reads like a lining rather than a component built to live in the full primary flow. A change made to answer one concern tends to be reviewed against that concern. Flag late additions for full interface and failure-mode review, including the loads of the environment they are installed in and their effect on functions they were not intended to touch.

- **"Instrument error" is a hypothesis, not a disposition.** Attributing an anomaly to the sensor is reasonable only if you define in advance the result that would reject that explanation, and the operating limits that apply until it is resolved. Returning to power with the question open shifted the burden of proof onto the plant.
- **Automate the comparison a person had to notice.** The rod-position anomaly was about three inches of travel, caught by an attentive staff member at 31 megawatts, after melting had begun at 15 to 20; the reactivity deficit behind it had been building since about 6. PRDC's response was a planned malfunction detection analyzer, a computer that would continuously compare actual rod positions with those expected for the current power, flow, and inlet temperature. Where a model of expected behavior exists, check measurements against it continuously and alarm on the difference, rather than depending on someone to spot a small discrepancy during a busy power ascension.
- **Design for inspectability and for loose parts.** An opaque coolant made a plenum inspection a matter of more than a year. Later sodium reactor designs generally adopted inlet nozzles with side openings, so that a single loose part could not block the flow. If a region cannot be inspected, design it so that the credible foreign objects in it cannot cause harm.
- **Other people's incidents are your test data.** A similar sequence at the Sodium Reactor Experiment had already shown how a flow blockage presents itself. Programs that read and apply the incident record of comparable systems buy that experience at no cost; programs that do not tend to repeat it.

This Month in SE History: Schiaparelli — The Parameter Nobody Specified

October 19, 2016 — Ten Years

At 14:45:23 UTC on October 19, 2016, about three minutes after entering the atmosphere of Mars, the European Space Agency's Schiaparelli module fired its mortar. It deployed a 12-meter supersonic parachute at about Mach 2. Inflation took roughly a second, in line with prediction. About two-tenths of a second after peak parachute load, the module's inertial measurement unit (IMU) measured a pitch rate larger than it could represent, and raised a saturation flag.

About a minute and a half later, while the module was still several kilometers up, the flight software computed an altitude below the surface of Mars. It released the parachute and back shell, fired the braking thrusters for three seconds, and shut them off at about 3.7 kilometers. Schiaparelli fell for roughly half a minute and struck the surface at about 150 meters per second, some 37 seconds before its planned touchdown. The next day, NASA's Mars Reconnaissance Orbiter photographed the impact site close to the center of the predicted landing ellipse.

Schiaparelli was a 577-kilogram demonstrator whose purpose was to validate entry, descent, and landing for the follow-on ExoMars rover mission. It flew to Mars attached to the Trace Gas Orbiter, launched on a Russian Proton rocket under ESA's ExoMars partnership with Roscosmos, with Thales Alenia Space as prime contractor. The orbiter entered Mars orbit the same day Schiaparelli crashed and went on to begin its science mission in April 2018. ESA's inquiry found that nearly every element did what it was built to do. The failure lived in a parameter that no one at system level had specified, measured, or tested.

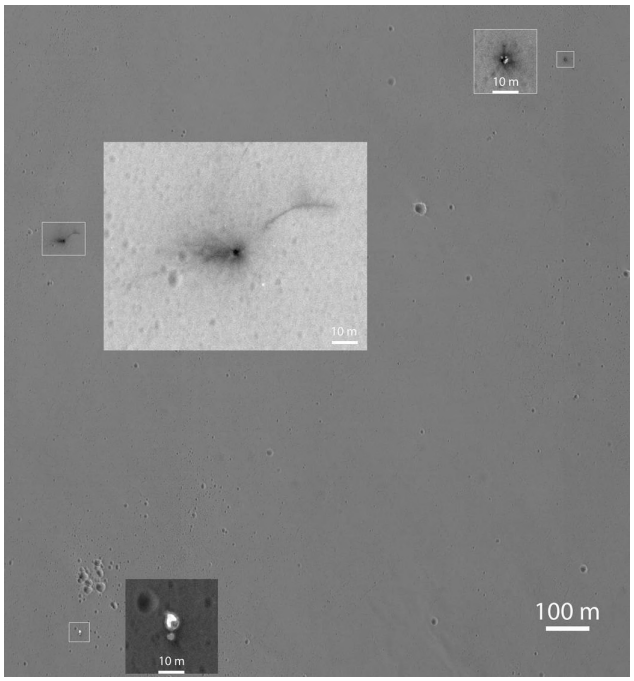


Figure 2. The Schiaparelli impact site as seen from orbit, six days after the landing attempt. Navigation to the landing site worked; what failed was the vehicle's estimate of which way was down. (NASA/JPL-Caltech/Univ. of Arizona)

Five Seconds of Disagreement

While the saturation flag was set, the guidance, navigation and control (GNC) software integrated an angular rate equal to the saturation threshold, as though that were the true rate. The capsule was in fact oscillating, and the oscillation soon damped out. The integrated error did not: the software's attitude estimate ended up about 165 degrees off, describing a vehicle nearly upside down.

The front shield separated on schedule, and the radar Doppler altimeter came on and returned good slant ranges. To turn those ranges into altitude, the software projected them through its attitude estimate. With the attitude nearly inverted, the result was a negative altitude. A consistency check between the radar and the IMU-based estimate duly failed. After more than five seconds of failure, the logic forced the radar into the loop anyway, on the reasoning that landing was impossible without it. The FDIR design had considered only one explanation for such a disagreement: a radar fault. The attitude estimate was never questioned. A negative altitude satisfied the conditions for terminal descent, and the sequence that followed was executed correctly, at the wrong time.

How the Parameter Went Unowned

ESA's Inquiry Board named four root causes. First, the parachute model underpredicted the dynamics: it did not include parachute area oscillation or other inflation disturbances. Post-flight comparison with NASA experience indicated such rates should have been expected. Second, the persistence time of the IMU saturation flag was too long, and the GNC handled saturation inadequately. Third, the approach to failure detection, isolation and recovery (FDIR) and design robustness was insufficient. Fourth, subcontractor management and hardware acceptance fell short.

The last is where the parameter slipped through. The persistence time was set in the IMU's application software. Its value was not recorded when the unit was accepted and was believed to be 15 milliseconds, and saturation behavior was never tested after delivery. The IMU model used in system simulation had been built by the prime contractor rather than validated by the supplier. The avionics test bench's engineering-model IMU could not be stimulated inside closed-loop GNC tests. The simulation models were not under configuration control against the as-built vehicle.

The margin logic compounded the gap. Pre-flight Monte Carlo runs had already shown single-axis rates above 150 degrees per second were possible, but no worst-case analysis was performed around that case. In the board's words, there was "no consideration of saturation as a feared event." The board also recorded the programmatic setting. Budget pressure had led the project to move from redundant to single-string avionics partway through development, and the 26-month Mars launch window created schedule pressure that opened the door to shortcuts in FDIR.

One observation from the report deserves attention from anyone who runs verification. The board noted that had the persistence time actually been 15 milliseconds, the landing would probably have succeeded, and the other root causes would probably never have been found.

Like the operators at Fermi, the software had evidence that something was wrong. Like them, its logic had already decided which source to doubt.

SE Lessons for Practitioners

- **Every embedded parameter in a delivered unit is a system parameter.** The saturation-flag persistence time was a supplier software setting that governed system behavior at the most critical moment of the mission. Identify embedded software and configurable parameters in every procured unit, specify the ones that matter at system level, record them at acceptance, and verify them by test.
- **A Monte Carlo analysis is only as good as its least-validated sub-model.** Thousands of runs through a parachute model that omitted area oscillation produced confident margins that did not exist. Supplement statistical analysis with sensitivity and worst-case analysis on the most influential parameters, and keep every model under configuration control against the as-built hardware.
- **When a cross-check fails, suspect both inputs, and check the physics.** The consistency check correctly detected a disagreement, and the logic then assumed the radar was at fault. The board recommended simple plausibility checks: altitude cannot be negative, and it cannot drop from 3.7 kilometers to below zero in a second. Such checks cost little and would have exposed the corrupted attitude.
- **Treat out-of-range conditions as feared events, even when predicted to be rare.** Because saturation was not expected, no degraded mode existed to handle it. The board believed a soft landing could potentially still have been achieved, using the radar to estimate attitude in two axes relative to the vertical. Design recovery paths for sensor saturation and loss of state knowledge, with degraded performance if necessary.
- **Beware the success that hides its root causes.** By the board's own reasoning, a correct 15-millisecond setting would likely have produced a landing and left the modeling, FDIR, and acceptance weaknesses intact for the next mission. The investigation also turned up a latent defect with no bearing on the crash: the flight software faithfully reproduced a sign error in the handling of saturated rates, because the requirement it was built to was incomplete. Code verified against a flawed specification passes. Verification that passes should still be examined for how it passed, and near-misses and unexplained margins deserve the same investigation as failures.

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