



# Welcome to the 37<sup>th</sup> ISSC!



# Education, Networking and Celebrating System Safety

The International System Safety Society (ISSS) convened its 37<sup>th</sup> Annual Conference at the Norfolk Waterside Marriott in Norfolk, Virginia from July 29 through August 2, 2019. The Conference was a positive experience in many ways. Here are some of the highlights:

- The Technical Program delivered a full schedule of high-quality papers and tutorials, making attendee choices difficult but rewarding regardless of venue, time and day.
- The Technical Program also provided balanced information on state-of-the-art techniques and processes. Conventional approaches to system safety were covered in both theoretical and application contexts, while Systems-Theoretic Process Analysis (STPA) was presented and taught by Dr. Nancy Leveson and Dr. John Thomas of MIT. Additionally, many papers discussing its application in different industries were offered. The topics of cybersecurity, machine learning and artificial intelligence, and autonomous driving safety were also covered.
- It was noted that the most effective system safety engineers are those who can clearly state their issues and remedies to leadership. As part of the intent of the ISSS' to provide value to its members, for the first time the Society offered presentation delivery development through training by Effective Presentations.
- The Society continued its development of the four Initiatives, actively moving to create a team structure so work can commence. It is anticipated that the teams will include ISSS members and sponsoring companies. Integration guidance will be provided by Executive Committee members.
- This year, every award available from the ISSS was presented. Please stay tuned to receive regular emails, LinkedIn articles, and *Journal of System Safety* feature pages.
- This was the also the first year the ISSS sponsored a "Youth STEM and System Safety Fun Day" for children in grades four through eight. On August 2, students from a local Boys and Girls Club were divided into teams to perform three experiments, all related to an element of system safety operational and design practices. For example, one of the experiments the students conducted was an exercise in handling "hazardous chemicals." From talking with students and reading their post-event surveys, they thoroughly enjoyed the experience and hope this becomes a scheduled activity at future ISSS conferences.
- There is a growing interest from early career system safety practitioners about how they can grow their involvement in the ISSS. This year, a special award was given to a college student for their technical presentation. Early career practitioners were also visible in some of the initiative discussions on course curricula and how to engage their peers.
- Attendees were engaged throughout the entire Conference — in the hallways, meeting rooms, during all break times, at luncheons, and at the end of each evening's program. There was a positive, palpable buzz in the air. There's no doubt that this Society is on the verge of expanding its size and sphere of influence.

I highly encourage all attendees to tell your peers about ISSS and what it can do for you. Come join us and help make the future happen!

— Mike McKelvey

# Where We Are – and Where We're Going



*Conference attendees got the chance to hear about the state of the International System Safety Society, as well as future goals the Society has set for itself (read more about those in this issue of the Journal of System Safety).*



# Scenes from the Conference





*Those attending the 37<sup>th</sup> ISSC had a multitude of tutorials, technical paper presentations, workshops and panels to choose from (see page 46 for a full list). In addition, networking opportunities were plentiful, and outings to see what the beautiful city of Norfolk, Virginia has to offer.*

# 2019 Conference Awards



*ISSS Chapter of the Year — Virtual Chapter*



*2019 ISSS Manager of the Year — Pamela Alte*



*2019 ISSS Professional Development Award — Arthur D. Barondes*



*2019 ISSS Scientific Achievement Award — Bijan Elahi*



*2019 ISSS Educator of the Year Award — Ken Rose*



*2019 ISSS President's Award — Mike McKelvey*



*2019 George Peters Award — Nikita Johnson*



*2019 ISSS Engineer of the Year —  
Donne DiFiglia*



*2019 ISSS Best Paper — Patrick Oliver*



*2019 ISSS International Award — Gabriele Schedl*

# ISSC 37 Curriculum

## Technical Papers

- Model Based Systems Engineering for System Safety: An Introduction
- The Safety Culture of Your Organization: Considerations That Relate to Your System Safety Program
- System Safety: A Beginner's Perspective
- Managing Unit Tests Using Vector Spaces
- Missing Risk Factors of Automated Driving Systems
- Selecting a Design Architecture to Support the Update of a Legacy Monolithic System
- An Assurance Framework for Independent Co-Assurance of Safety and Security
- Hazard Considerations for Vulcan Centaur V Integrated Space Vehicle and Launch Vehicle Operations
- Managing Complexity and Uncertainty of System Safety and Cyber Security using SSAF
- Speaking Risk with Our PMs
- Integrating STPA into Large Organizations – Lessons Learned at General Motors
- Addressing Multicore Risk for Firm and Soft Real-time Safety Critical Systems
- Strategy for Overcoming Regulatory and Technology Gaps to License Ground Transportation at the Speed of Sound in an Agile and Global Business Environment
- A Security Integrated Safety Model for Hazard Analysis of Internet of Things (IoT)
- Overview of the ISO PAS 21448: Safety of the Intended Functionality
- Improving the Standard Risk Matrix Results Using STPA
- But the Mishap Wasn't My Fault: Including the Integration and Interoperability Fratricide Context in your Functional Hazard Analysis
- Managing Industry Risk: Commercial Space Flight Safety Reporting
- Integration of an Active STPA into Safety Management Systems
- Learning from Creeping Changes
- STPA: A Systems Approach Applicable to Self-Driving Cars
- A Critical Review of Probabilistic Safety Criteria for Commercial-Airplane System Designs
- Systems Theoretic Process Analysis (STPA) for Security (STPA-Sec) of Aircraft Systems
- System Safety Engineering Methodology Applied to High Voltage Automotive Battery Systems
- Harnessing Uncertainty in Autonomous Vehicle Safety
- The Safety Challenges of Unmanned Autonomous Lethal Weapon Systems
- Is AI in Healthcare Doomed, or Destined for Greatness?
- System Safety Semantics — The Use and Misuse of Terminology
- System Safety & Security: Establishing a Holistic Assurance Process for Safety-critical Systems
- Chasing the Black Swan
- Model-Based Functional Safety for Complex Software Intensive Systems
- Concept and Development of a Science, Engineering & Technology Student (SETS) System Safety Challenge Program
- An Examination of the Implications of 2017 Revisions to General Criteria for Accreditation of Engineering Degree Programs under ABET-EAC for inclusion of System Safety or Safety Through Design Concepts

- Artificial Intelligence (AI) — The Need for New Safety Standards and Methodologies
- The Evolution of the System Safety Engineering Discipline

## Tutorials

- Nuclear Weapon Safety — Initial Approaches, Lessons Learned from Accidents and Related Testing
- System Safety: Hands-On System Safety Basics
- Safety Class for the Masses
- Pulling the Thread: Hazards Analyses from Start to Finish
- Why You Should Care About the “-ilities”
- Evolution of the Modern U.S. Nuclear Weapon System Design Safety Principles
- Developing Electronic Systems for Safety-Critical Applications
- Evolution of U.S. Nuclear Safety Requirements and Related Safety Bases
- The Terrible Triad! Safety and Security for Autonomous Systems
- Accident Analysis and Hazard Analysis Using STAMP
- Application of Divergence to Assess System Resilience against Unforeseen Threats
- Modern U.S. Nuclear Weapon System Safety Design Process and Panel Q&A with NW Experts
- Analysis of an Energy Storage System (ESS) Failure and Fire Event
- Applying Safety Concepts and Principles in Vital Controller Design
- Tips and Lessons Learned on Reviewing FTAs
- What the Bhopal and Texas City Accidents had in Common, and Ways We Can Improve
- Accident Analysis and Hazard Analysis Using CAST
- Reconstructing Your Process Hazard Analysis for Success!
- System Safety: Practical Generation of Safety Cases With the Help of GSN
- Quantitative Risk Management
- Accident Analysis and Hazard Analysis using STPA
- Risk Uncertainty Reduction Calculation Tutorial
- Qualitative Risk Analysis: A Redbook Tool for the IH/OS Tool Box
- Cyber Safety and Security
- Improved Gamification Approach for Software Safety Instruction
- Helping Beginners Use System Safety Methodologies Within a System Safety Evaluation
- System Safety Management

## Workshops

- Attack of the Trees! A Modified Fault Tree Approach to System Security
- What are Safety Requirements and How are They Identified from Safety Assessments?
- Introduction to System Safety and Hazard Tracking Workshop
- Post Conference Workshop — Problem Solving, Causal Attribution and Evidence Based Analysis

## Panels

- Implementing STEM Outreach Programming with System Safety

# Thanks to the ISSC Sponsors!

The International System Safety Society would like to thank the sponsors of the 37<sup>th</sup> International System Safety Conference — we appreciate your support!



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