Aalto University is proud to host the 2nd edition of the International Seminar on Safety and Security of Autonomous Vessels (ISSAV) together with the 7th edition of the European STAMP Workshop and Conference (ESWC). The ISSAV promotes all aspects of maritime safety and security in the context of autonomous vessels and maritime ecosystem. The ESWC focuses on applications and studies related to the Systems-Theoretic Accident Model and Processes (STAMP) which is a new systems-thinking approach to engineer safer systems.

SCOPE

ISSAV

Autonomous vessels have become a topic of high interest for the maritime transport industry. Recent progress in the development of technologies enabling autonomous systems has fostered the idea that autonomous vessels will soon be a reality. However, before the first autonomous vessel can be released into her actual context of operation, it is necessary to ensure that it is safe and secure. The aim of ISSAV is to promote all aspects of maritime safety and security in the context of autonomous vessels. The seminar focuses on exchanging knowledge about key safety and security challenges and opportunities in the context of autonomous vessels and the autonomous maritime ecosystem. The seminar has a special emphasis on:

- The challenges in managing safety and security in the operation of autonomous vessels and the entire ecosystem of an autonomous maritime system
- Innovative approaches for managing the safety of autonomous vessels, supporting the design, operations and managerial strategies for ensuring the safety in the functioning of the autonomous maritime system
- Digitalization as technological enabler for efficient safety and security assurance in the context of autonomous shipping
- The standardization of safety and security for autonomous vessels
- The development of intelligent security strategies for establishing resilient and robust systems for autonomous vessels
- Safety and security integration in the operative context of autonomous maritime systems
- Autonomous vessels operating in extreme environments (ice and arctic conditions)
ESWC

Traditional system safety approaches are being challenged by the introduction of new technology and the increasing complexity of the systems we design, manufacture and operate. STAMP and its associated tools deal with the complexity of systems and provide systematic ways to analyze and assess existing and conceptual systems proactively or detect and illustrate deficiencies revealed through investigations. The ESWC brings together researchers and practitioners who apply, or want to get familiar with, STAMP that is widely used in different sectors such as space, aviation, healthcare, defense, nuclear, railways, infrastructure, maritime and automotive. The conference covers the following topics for presentations:

- Experiences using STPA, STPA-Sec, and CAST
- Introducing STAMP, STPA, and CAST into large organizations
- Safety-guided and Security-guided design using STPA and STPA-Sec
- Using STPA to make decisions
- Accident/loss analyses
- Certification and regulatory issues
- Evaluations and comparisons with traditional techniques
- Risk management and identifying leading indicators
- Applications to security and other areas such as workplace safety
- Safety Management System development and evaluation
- Tools, processes, and other support for analysis and design using STPA and CAST
- Management and adoption experiences or challenges
- Applications to other emergent properties (beyond safety and security)
PROGRAM
(Preliminary)

Tuesday 17.09.2019

ISSAV

Keynote Speakers

Pierre C Sames
Senior Vice President, DNV GL - Group Technology and Research Director
TOPIC: “Assurance of complex cyber-physical systems – a class perspective”

Richard Balzano
Deputy Maritime Administrator, Maritime Administration, USA
TOPIC: “Automation and the Maritime Industry”

Session I

• Risk Assessment on a Container Ship considering different Autonomy Levels
  Ventikos et al., National Technical University of Athens, Greece
• Selecting risk assessment method for remote pilotage in intelligent fairway: A review
  Lahtinen et al., Aalto University, Finland
• A Framework for Automatic Risk-Based Decision Making for Autonomous Ships
  Rokseth, Norwegian University of Science and Technology (NTNU), Norway

Session II

• Korean Technical Innovation toward Autonomous Ship and Smart Shipbuilding on Ensuring of Safety
  Kwon et al., Research Institute of Medium & Small Shipbuilding, South Korea
• Prediction Model for Human Failure Probability of Autonomous Cargo Ships
  Zhang et al., Wuhan University of Technology, China
• Modeling Human-like Decision Making of Outbound Autonomous Ships
  Xue and van Gelder, Delft University of Technology, Netherlands
• Developing a framework for Trustworthy Autonomous Maritime Operations
  Turnock et al., University of Southampton, United Kingdom

Session III

• Safe navigation literature review: autonomous and connected vessels considered
  Wahlström, VTT Technical Research Centre of Finland Ltd., Finland
• Simulator-based Verification of Autonomous Navigation Systems
  Pederson and Glomsrud, DNV GL, Norway
• Study on complex network and network dynamics for marine traffic situation
  Sui et al. Wuhan University of Technology, China
• Comparison of system modeling techniques for autonomous maritime systems
  Basnet et al., Aalto University, Finland

Social evening (Conference dinner)
Wednesday 18.09.2019

Keynote Speaker

Vesa Marttinen
Director of Cruise, Ferry and Superyachts, Wärtsilä

TOPIC: “Data & analytics to drive the safety - as rest of marine operations”

Session IV

• Harnessing Serverless computing to improve security for the Autonomous Vessel
  Mohan, Deloitte, United Kingdom
• Dynamic Targets Detection in Inland River Crossing Area Based on Marine Radar Image and a
  Simplified Faster R-CNN Algorithm
  Ma et al. Wuhan University of Technology, China

Session V

• Challenges of Artificial Intelligence and Machine Learning Software in Autonomous Vessels
  Ashraf et al., Åbo Akademi University, Finland
• Trustworthy and Explainable AI in Autonomous Vessels
  Glomsrud et al., DNV GL, Norway
• Assessment of the Required Subdivision Index for Unmanned Ships based on Equivalent Safety
  De Vos and Hekkenberg, Delft University of Technology, Netherlands

Session VI

• Operational Demonstration of an Autonomous Offshore Multicomponent Robotic System
  Villa et al., Tampere University, Finland
• Construction Mode Detection for Autonomous Offshore Heavy Lift Vessel
  Ye and Reppa, Delft University of Technology, Netherlands
• Remotely Operated Search and Rescue Ships in the Canadian Arctic: Their Risk Dimensions and
  Regulatory Implications to the Arctic Search and Rescue Agreement
  Yoo and Goerlandt, Dalhousie University, Canada
• Towards the Autonomous Ship Code
  Bergström et al. Aalto University, Finland

Session VII

• Ship collision pre-warning from stand-on ship perspective: A case study for autonomous ship
  Du et al. Aalto University, Finland
• Safety related cyber-attacks assessment for autonomous inland ships
  Bolbot et al., University of Strathclyde, United Kingdom
• Risk and safety management of autonomous systems: a literature review and initial proposals for the
  maritime industry
  Manzur et al., Aalto University Finland

Conference closing
Wednesday 18.09.2019

Tutorials

• STPA Hazard Analysis Introduction Tutorial
  John Thomas Massachusetts Institute of Technology, USA
  Martin Rejzek, Zurich University of Applied Sciences, Switzerland

• CAST Accident Analysis Introduction Tutorial
  Nancy Leveson/ John Thomas, Massachusetts Institute of Technology, USA

Thursday 19.09.2019

Keynote Speaker

John Thomas
Executive Director of MIT’s Partnership for Systems Approaches to Safety and Security (PSASS)

TOPIC: “Recent STAMP/STPA developments and new applications to autonomy”

Session I

• STPA Applied to a Hyperledger-based Autonomous Railway System
  Pelser et al., Vrije Universiteit Amsterdam, Netherlands

• STPA analysis for safety analysis of cooperative material handling machinery
  Kivelä and Furmans, Karlsruhe Institute of Technology, Germany

Session II

• STPA in Pension Fund Investments
  Björnsdóttir et al., Stiki / Reykjavik University, Iceland

• STPA in early design phase for Defense in Depth concept for the nuclear industry
  Bar Or et al., Ben-Gurion University, Israel

• Independence of automatic operation system in a university and the surrounding area
  Ishitsuka et al. Hosei University, Japan

Session III

• STPA Analysis Applied on Different Operational Modes of the Same System: A Case Study on the Fully Autonomous Aerial Rescue System ROLFER
  Lygouras et al., Democritus University of Thrace, Greece

• STPA on intentional jamming of Global Navigation Satellite Systems
  Thorsteinsson et al., University of Iceland, Iceland

• A comparative safety assessment for Direct Current and Direct Current with hybrid supply power systems in windfarm Service Operation Vessel using STPA
  Bolbot et al., University of Strathclyde, United Kingdom
Session IV

- Gas Safety in Low-Carbon Energy Provision: Hazard Analyses of Different Scenarios
  Riemersma et al., Delft University of Technology, Netherlands
- Supporting better design of Eco-Industrial Parks with Systems Theory
  Keränen and Salminen, VTT Technical Research Centre of Finland Ltd., Finland
- A Mathematical Model for Real-time Safety Level Calculation: An application
  Kokkinos et al., Democritus University of Thrace, Greece
- Flint (Michigan, USA), Analysis of Disastrous Water Pollution Event Using Extended STAMP Model
  and CAST Method
  Hartmann and Danilov, Ben-Gurion University, Israel

Social evening (Conference dinner)

Friday 20.09.2019

Keynote Speaker

TBC
TBC
TOPIC: “TBC”

Session V

- XSTAMPP – Fit for Future
  Fechner and Wagner, University of Stuttgart, Germany
- Presentation of RM Studio – STPA Software Module
  Björnsdóttir and Brown, Stiki / Reykjavik University, Iceland

Session VI

- Towards maritime traffic coordination in the era intelligent ships: a system theoretic study
  Heikkilä et al., VTT Technical Research Centre of Finland Ltd., Finland
- Development of functional safety requirements for DP-driven servicing of wind turbines
  Puisa and Bolbot, University of Strathclyde, United Kingdom
- An initial evaluation framework for the design and operational use of maritime STAMP-based safety
  management systems
  Valdez Banda et al., Aalto University, Finland

Session VII

- Exploring the Modeling of Attack Strategies for STPA
  Altawairqi and Maarek, Heriot Watt University, United Kingdom
- Applying STPA to the Enterprise IT System of a Large Organization
  Anna G et al., National Cyber Security Centre, United Kingdom
- Border crossing point as a socio-technical system: applying STAMP and STPA to border security
  Salmela et al. VTT Technical Research Centre of Finland Ltd., Finland
Session VIII

- STPA Based Approach for a Resilience Assessment at an Early Design Stage of a Cruise Ship
  Bongermino and Gualeni, University of Genoa – UNIGE, Italy
- Towards STAMP approach based protection of Underwater Cultural Heritage
  Aps et al., University of Tartu, Estonia
- STAMP-inspired identification of research gaps and safety actions’ importance. Revisiting unmanned merchant vessel’s safety control structure
  Wróbel et al., Gdynia Maritime University, Poland
- STPA for the Hazard Analysis of Autonomous Autopilot in Open Sea Operation
  Chaal et al., Aalto University, Finland

Conference closing

The final ISSAV and ESWC 2019 program will be published by the end of August in the website: [https://www.aalto.fi/events/issaveswc-2019](https://www.aalto.fi/events/issaveswc-2019)

**NOTE:**

The International Seminar on Safety and Security of Autonomous Vessels 2019 is linked to the Virtual Special Issue “Autonomous Vessels Safety” in Safety Science. The most outstanding papers of the conference will be invited to submit the papers to this special issue. Authors submitting abstracts to the ISSAV 2019 will receive an invitation letter with instructions for the submission of manuscripts to the VSI: Autonomous Vessels Safety.

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**ISSAV & ESWC CHAIR**

Pentti Kujala
Osiris A. Valdez Banda (Co-chair)

**ISSAV**

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John Thomas, Massachusetts Institute of Technology, US
Pierre C Sames, DNV GL, NO
Vesa Marttinen, Wärtsilä, FI
International Seminar on Safety and Security of Autonomous Vessels (ISSAV) & European STAMP Workshop and Conference (ESWC) 2019

17-20 September 2019, Helsinki/ Espoo, Finland

ESWC
Martin Rejzek, Zurich University of Applied Sciences, CH
Nektarios Karanikas, Queensland University of Technology, AU
Svana Helen Björnsdóttir, Stiki, IS
John Thomas, Massachusetts Institute of Technology, US
Stefan Wagner, University of Stuttgart, DE
Sven Stefan Krauss, Zurich University of Applied Sciences, CH
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Osiris A. Valdez Banda; Pentti Kujala; Spyros E. Hirdaris; Sunil Basnet, Meriam Chaal; Ketki Kulkarni and Sophie Cook.

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Venue:
Hanasaari Culture Center and Conference Hotel, Espoo, Finland. https://www.hanaholmen.fi/en/