

Guidelines and Testbed for Maritime Cybersecurity

Synopsis

The maritime industry has showed an increasing trend in adopting ICT for enhanced monitoring, communication, and connection capabilities, which can help improve productivity and reduce operational costs. With cyber threats on the rise, increased connectivity between and among ship-to-ship and ship-to-shore infrastructure also means that disastrous effects on one entity can cascade down to others. Hence it is crucial for the maritime industry to understand these cyber risks and how to mitigate them.

In this webinar, the iTrust team will share its results from a 1-year study on "Guidelines for Cyber Risk Management in Shipboard Operational Technology (OT) systems" and discuss the need for a maritime testbed for cybersecurity research. Following this, the Centre of Excellence in Maritime Safety (CEMS) team will share their views on Maritime Cybersecurity.

Webinar Programme

Date	25 February 2022 (Friday)
Time	1000 – 1120hrs (GMT +8)
1000 – 1010	Welcome Remarks Mr Tan Cheng Peng, Executive Director, Singapore Maritime Institute
1010 – 1025	Update: Guidelines for Cyber Risk Management in Shipboard Operational Technology (OT) Systems Ms Priyanga Rajaram, Senior Research Assistant, iTrust
1025 – 1035	The Need for Maritime Testbed for Cybersecurity Research Prof. Jianying Zhou, Co-Centre Director for iTrust
1035 – 1055	Maritime Cybersecurity – A Ship Master's Overview Captain Ashwin Madhav Khandke, Singapore Polytechnic
1055 – 1115	Question and Answer
1115 - 1120	Closing Remarks Mr Daniel Zhang, Executive Director, CEMS

Supporting partners:

To register for the webinar, please click [here](#).

About the Maritime and Port Authority of Singapore (MPA)

The Maritime and Port Authority of Singapore (MPA) was established on 2 February 1996, with the mission to develop Singapore as a premier global hub port and international maritime centre (IMC), and to advance and safeguard Singapore's strategic maritime interests. MPA is the driving force behind Singapore's port and maritime development, taking on the roles of Port Authority, Port Regulator, Port Planner, IMC Champion, and National Maritime Representative. MPA partners the industry and other agencies to enhance safety, security and environmental protection in our port waters, facilitate port operations and growth, expand the cluster of maritime ancillary services, and promote maritime R&D and manpower development.

For more information please visit www.mpa.gov.sg

About the Singapore Maritime Institute (SMI)

The Singapore Maritime Institute (SMI) is a joint effort by the Maritime and Port Authority of Singapore (MPA), the Agency for Science, Technology and Research (A*STAR) and the Singapore Economic Development Board (EDB).

Established in April 2011, the SMI develops strategies and programmes to achieve its mission with key focus areas in sectors such as port, shipping and maritime services. The SMI charts the maritime research strategy and promotes greater industry-academia R&D collaborations to be undertaken in Singapore.

As a whole-of-Government approach, the agencies work together in initiatives driven through the SMI. The formation of the SMI will strengthen Singapore's research manpower and capabilities as a global maritime knowledge hub to enhance the overall positioning and competitiveness of the maritime industry.

For more information, please visit www.maritimeinstitute.sg

About iTrust

iTrust is the Centre for Research in Cyber Security at the Singapore University of Technology and Design. iTrust research focuses on the development of advanced tools and methodologies to ensure the security and safety of current and future systems in five thrusts: (1) Cyber Physical Systems (2) Internet of Things (3) Enterprise Networks (4) Autonomous Vehicles and (5) Blockchain.

One of iTrust's research objectives is to improve our understanding of cyber threats to CPS and to develop and experiment with strategies to mitigate such threats. Our approach is based on well understood technical foundations borrowed from the interdisciplinary fields of control theory, artificial intelligence, axiomatic design, and software engineering. The proposed models and techniques are being evaluated against, and demonstrated in our Secure Water Treatment (SWaT) Testbed, Water Distribution System (WADI) testbed, and Electric Power and Intelligent Control (EPIC) testbed.

iTrust researchers are drawn from across SUTD in multidisciplinary fields to enrich the depth, breadth, and quality of research. International academic collaborators include Ben Gurion University, Imperial College, Massachusetts Institute of Technology, Missouri University of Science and Technology, The University of Texas at Dallas, and University of Illinois at Urbana-Champaign / Advanced Digital Sciences Center.

For more information, please visit <https://itrust.sutd.edu.sg/>

About CEMS

Established in September 2018, the Centre of Excellence in Maritime Safety (CEMS) is jointly launched by the Singapore Polytechnic (SP) and Singapore Maritime Institute (SMI). We partner our valued industry partners, government agencies and Institutes of Higher Learning, to develop Human-Centric technologies to enhance navigational and operational safety.

As part of Singapore's strategy of skill sets upgrade of our workforce, we will enhance training assessment systems & solutions with Singapore Maritime Academy (SMA) to ensure our seafarers are future ready.

For more information, please visit [Centre CEMS - Industry and Partnerships | SP](#)

For collaboration, please contact Vincent_Lee@SP.EDU.SG



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Biography:

Capt. Ashwin Khandke began his sea career in 1979. He received his COC₁ qualification in Australia in 1987. He was Captain on large oil tankers between 1992 and 2006. In the early years of computerization and digitalization, he championed the judicious use of information technology with both his crew members and organisation. Long before ships had e-mail access for the crew, Capt. Ashwin made it possible for crew to receive e-mails via Inmarsat -C, through his own website seaconnection.com (now discontinued). Risk Management has been the cornerstone of his work. His focus remains the contributors to Operational Risk. Therefore, he views Cyber Security as a major enabler of safe operations, requiring robust controls through design and training. During his career at sea, he continually championed the advancement of knowledge for ship operations so as to continually seek for reduction of operational risks during Navigation and Cargo Operations.

He did his M.Sc in Safety, Health and Environmental Technology from NUS.

He is an alumnus of Delhi University, LBS College of Advanced Maritime Studies, Mumbai, Australian Maritime College, Launceston and NUS Singapore.

Synopsis:

Ships have undergone monumental advancements in technology, automation and control, remote connectivity, even autonomous operations. A ship today is an array of cyber enabled engineering systems, which through complex interfaces manage the demands of propulsion, power, navigation, vessel condition monitoring, fire and gas detection, emission control, environmental monitoring, and compliance, not to forget the continuous delivery of utilities. Cyber Technology is also enabling a quantum jump in data transfer between networks, internal and external along with the means to control operational parameters remotely. Hence the fidelity and security of that data is vital. However, the fundamental on the concept of harm has not changed. If Cyber has the capability of triggering such an event, then it is vital that a proper understanding of these Cyber enabled fault pathways is obtained. Therefore, context for this discussion on Maritime Cyber Security, where the concept of a test bed capability provides the means to identify and examine these fault pathways.