

**TRACK 4: MISSION SYSTEMS / VIRTUAL TRAINING**

**“MANAGING EPISTEMIC UNCERTAINTIES IN THE UNDERLYING MODELS OF SYSTEM SAFETY ASSESSMENT FOR SOCIO-TECHNICAL SYSTEMS”**

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**ABSTRACT**

In System Safety Engineering (SSE), epistemic uncertainty is an ever-present possibility when reasoning about the safety concerns and causal relationships affecting the safety of the system. Such uncertainty is common in SSE models that are used during the safety assessment. Uncertainty around causation thus needs to be managed well. Existing safety assessments tend to ignore unknown uncertainties, and stakeholders rarely track known uncertainties well through the system lifecycle. In this paper, we outline our approach to managing epistemic uncertainty in safety assessment by focusing on known and unknown uncertainty about SSE models. First, we introduce a way of describing SSE models using a conceptual model that is based on the IEEE 42010 standard. Next, the conceptual model is used to identify gaps in managing uncertainties in SSE models. Lastly, we describe in detail the 3 steps under the approach. These 3 steps involve identifying unknown uncertainties, documenting them as known uncertainties and tracking them throughout the system engineering lifecycle as part of existing hazard analysis techniques. Our approach can plausibly provide a structured way to manage model uncertainty in safety assessment.

**BIOGRAPHY OF SPEAKER**



ME6 Leong Wai Kiat, Chris heads the Air Communications and Systems Branch in Air Engineering and Logistics Department. He was formerly overseeing the maintenance and operationalisation of the airborne network system in the air force, and also was an operations manager in the Air Plans Department orchestrating the acquisition of networked systems. He holds a BEng in Electrical Engineering from the National University Singapore and MTech (Knowledge Engineering) from the Institute of Systems Science. He was also the top student from the Master of Defence Technology and Systems Programme with a MSc (Defence Technology and Systems) from the NUS, and a MSc (with Distinction) in Electrical Engineering from the US Naval Postgraduate School. He is currently doing his PhD under the High Integrity Systems Engineering group in the University of York, Computer Science Department.