



CRA's 7th Risk Forum ***To Automate or Not To Automate***

Stratford Manor Hotel, Warwick Road, Stratford Upon Avon, CV37 0PY

Day 1 Wednesday 5th October 2016

09.00 Registration and Refreshments

09.30 Welcome, Introductions and Aims for the Risk Forum
Jasbir Sidhu, Managing Director CRA

09.45 To Automate or Not To Automate – An Operator's Perspective
Roy Hamm and Maxym Rychkov– EDF-Energy

Max Rychkov is an Operational Engineer working on the Hinkley Point C Project where Roy Hamm is the Project Operations Manager. This presentation will give the delegates an insight into the Operator's views of risk associated with automatic control loops. They will detail their experiences in a most unusual way and no doubt provoke interesting debate and discussion.

10.25 The Design and Implementation of Modern Automation Systems
Jeton Partini – CGM Sweden

This presentation discusses some of the capabilities available in a modern automation system and how to apply innovative control room planning and technology to support decision making and help humans handle the abnormal situations in a safe and effective manner. Jeton will present results from research performed in-house and centered on operator health, and the impact of an intelligent and ergonomic workspace that can both mitigate risk and increase productivity.

11.05 Morning break

11.25 Small Modular Reactor Automation and Passive Safety
Karl Fleming

This presentation will cover the passive safety features being developed for small modular reactors (SMRs). SMRs are intended to place considerably less reliance on the operator to ensure nuclear safety. Karl will also discuss how the industry is addressing seismic events for multi-unit SMR sites.

12.05 The Automation Myth
Les Ainsworth – CRA/Synergy

The Automation Myth will cover the necessity to integrate automation with an operator's other tasks. Failure to do this can decrease the reliability of the operation and also make it more difficult for an operator to take manual control of a function when needed. This can largely be due to operator boredom and lack of awareness. Les will give guidance upon the level of support needed to ensure a reliable operation of the task.

12.45 Cyber Threats - Fact or Fiction?
Mark Saville – Data2Vault

The world is getting more connected with the Internet of Things, M2M, smart meters, driverless cars, online shopping and Internet payments, but who is winning the information security battle? And which threats are the ones to focus on?

13.05 Lunch



14.00 Pushing the Human Performance Envelope - Simulating Challenging Scenarios for Pilots
Barry Kirwan – Eurocontrol

Accidents these days are rarely caused by a single factor like fatigue or workload or loss of situation awareness - but rather a combination of these factors. So, where do the performance edges lie? This presentation will show highlights from a large scale research project (Future Sky Safety) where we are literally pushing pilots in advanced full-scope cockpit simulators to find their performance edges, and to see how they can recover from them. At what point should automation take over?

14.40 How Controllable is an Autonomous Vehicle? A Functional Safety View
Gunwant Dhadyalla and Paul Jennings - Warwick Manufacturing Group
The University of Warwick

Over the past decade the electronic and software content in vehicles has increased significantly leading to the evolution of automated systems and driverless cars. Although the technology for the same has made rapid strides, appropriate safeguards from legislation, standards and testing methodologies have lagged behind.

Gunwant Dhadyalla and Paul Jennings present the challenges raised by the autonomous vehicle for functional safety analysis and WMG's preliminary approaches to explore the interaction of the user with an autonomous vehicle and using the novel WMG 3xD simulator for Intelligent Vehicles based at the University of Warwick for conducting experiments to understand the impact on controllability.

15.20 Afternoon break

15.40 Culture and Infrastructure Required to Automate Nuclear Processes
Tim Ingram – MMI Engineering

Since the inception of the nuclear industry there has been a cyclical dependence and distance from reliance on SQEP operators to undertake tasks. This has numerous effects; however these few key examples will serve to demonstrate the impact of reliance on automation to throughput processes and overall plant availability. There is a trend in the decommissioning sector towards a greater reliance placed upon the operator. This discussion will be balanced by a critique of approaches and standards used in other industry sectors, all of which have a constant trend to automation, and show how the decommissioning sector may learn from this security battle? And which threats are the ones to focus one?

16.20 Developing a Safety Case for Use of Unmanned Aerial Vehicle Technology
Andy Buchan – SaRS

Developments in UAV technology offer significant opportunities for cost and risk reduction in a range of inspection and measurement activities. This presentation will cover the challenges of producing a safety case for the use of UAVs, highlighting the deployment and development of UAV technologies at the Sellafield nuclear complex.

17.00 Question and Answer Session

17.15 Close

18.45 Pre-dinner drinks on the terrace (weather permitting).
If weather does not allow, drinks will be served in the bar next to the dining room.

19.30 Forum Dinner



Day 2 Thursday 6th October 2016

**09.00 Designing for Safety trumps Operability: A Case Study at Sizewell B
Bryan Coxson – EDF Energy**

This talk will cover a period of over 35 years and focus on some specific features of the Sizewell B design relating to Instrument Air Systems. In 1995, these features assisted in enabling Sizewell B to be the only 'off the drawing board' design classed by the US Electric Power Research Institute (EPRI) as an 'Advanced PWR'. Explanation will be given as to how these features have been modified in the light of Operational Experience, the Sizewell B Living PSA, and current HRA techniques. The final outcome – 35 years on – was the automating of a claimed operator action following a plant modification completed during a recent outage at the station.

**09.40 'Computer Says No' - Safety and Security Challenges with Digital Control Systems
Hugh Stephenson - CRA**

An increasing amount of digital Control and Instrumentation is being used in automation at existing and planned Nuclear Power Plants. Whilst the operational benefits are large, this increase presents a range of new challenges in the areas of both nuclear safety and security. In this session, some of these challenges will be examined further, in particular the estimation of reliability of equipment for use in both probabilistic and deterministic safety cases, drawing comparisons with the equivalent reliability of analogue and manual alternatives.

10.20 Morning break

**10.40 The Use of Advanced Control Rooms and Automation in the UK Nuclear Sector
– a Regulatory Perspective - Richard Screeton – ONR**

The use of computerised control and instrumentation (C&I) has become the established norm across many high hazard sectors. Despite many benefits, the deployment of these technologies is not without risk, and regulatory attention worldwide has been drawn to a number of high profile incidents, where failures in these technologies have been implicated in the subsequent investigations.

**11.20 Automating Train Protection - The Early Successes and Pitfalls
Colin Dennis – Independent Rail Safety Specialist**

Traditionally the control of trains, including stopping at red signals, relied solely on the actions of the driver based on them observing the lineside signals. Following notable train accidents in the late 1980's and 1990's technological solutions were sought to provide automatic train protection to initiate the train brakes if the driver failed to do so in time.

This presentation considers the technology introduced and discusses both the successes and the pitfalls that resulted from the influence on driver behaviour and unintended consequences that emerged.

**12:00 Safe Innovation in a Future Energy System
Stuart Hawkworth, Energy Innovation Centre, Health & Safety Laboratory**

In this presentation Dr Stuart Hawkworth will talk about some of the HSL's recent ground-breaking work, thoughts and role for the future in the UK and internationally.

The activities of HSL cover a broad range of technologies in Power, Heat and Transport, working to ensure that the rapid progress in these fields now, and with an eye to the future, occur safely and smoothly.

12.40 Question and Answer Session – Summary

13.00 Risk Forum Close - Lunch and Delegates Departure