Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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MSc (University of Victoria, 2011)
BSc (University of Victoria, 2003)

"Information System Hazard Analysis"

Department of Computer Science

Thursday, December 14, 2017
9:00 A.M.
Clearihue Building
Room B007

Supervisory Committee:
Dr. Jens Weber, Department of Computer Science, University of Victoria (Co-Supervisor)
Dr. Morgan Price, Department of Computer Science, UVic (Co-Supervisor)
Dr. Abdul Roudsari, School of Health and Information Science, UVic (Outside Member)

External Examiner:
Dr. Alan Wassyng, Computing and Software, McMaster University

Chair of Oral Examination:
Dr. Chris Upton, Department of Biochemistry and Microbiology, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

We present Information System Hazard Analysis (ISHA), a novel systemic hazard analysis technique focused on Clinical Information System (CIS)s. The method is a synthesis of ideas from United States Department of Defense Standard Practice System Safety (MIL-STD-882E), System Theoretic Accidents Models and Processes (STAMP) and Functional Resonance Analysis Method (FRAM). The method was constructed to fill gaps in extant methods for hazard analysis and the specific needs of CIS. The requirements for the method were sourced from existing literature and from our experience in analysis of CIS related accidents and near misses, as well as prospective analysis of these systems. The method provides a series of iterative steps which are followed to complete the analysis. These steps include modelling phases that are based on a combination of STAMP and FRAM concepts. The method also prescribes the use of triangulation of hazard identification techniques which identify the effects of component and process failures, as well as failures of the System Under Investigation (SUI) to satisfy its safety requirements. Further to this new method, we also contribute a novel hazard analysis model for CIS as well as a safety factor taxonomy. These two artifacts can be used to support execution of the ISHA method. We verified the method composition against the identified requirements by inspection. We validated the method's feasibility through a number of case studies. Our experience with the method, informed by extant safety literature, indicates that the method should be generalizable to information systems outside of the clinical domain with modification of the team selection phase.