Template for thesis project proposals

Project Title	Safety at the Worlds First Full-Scale Test Environment for Future Road Safety
Author(s)	Walid Taha
Keywords	Modeling, simulation, safety, hybrid systems, automotive
Project description	As in any environment with physical hazards, a safety testing ground must itself also be safe for the personnel and the assets involved. This requirement becomes particularly challenging in facility that is intended for testing state-of-the art vehicle technologies, which is precisely the case for the newly founded AstaZero test track. The complexity in dealing with such environments comes from no longer having physical components but also computational and communication components that play a large role both in vehicle operation and the test track operation. The goal of this project is to investigate the feasibility of rigorous-but-practical methods for the analysis of safety in such an environment, with the goal of helping identify critical sources of risk as well as to assist in the formulation of the functional and reliability requirements for various aspects of the test track. At this time, the project identifies at least eight research question, which means there is space for multiple students to work on this project. - How do we define safety for: * An inanimate (car, equipment, track) * A human (driver, track personnel, company personnel, track guest) - How does such a definition fit within the framework of ISO 26262? - Is there a fail-safe mechanism that we can guarantee to be safe? - How do we assign responsibility for a violation of safety? - How do we identify safety problems/risks in given scenarios? - How do we measure safety/risks on the test track? - What are the technical requirements for the communication infrastructure? - How do we structure contracts for the use of the test track? - How do we evaluate risks associated with certain uses of the test track?
References	Masood, J., Philippsen, R., Duracz, J., Taha, W., Eriksson, H., & Grante, C. (2014). Domain analysis for standardised functional safety: a case study on design-time verification of automatic emergency braking. In International Federation of Automotive Engineering Societies 2014 World Automotive Congress, Maastricht, The Netherlands, 2-6 June, 2014 (pp. 845-854). Royal Netherlands Society of Engineers (KIVI). Duracz, A., Eriksson, H., Bartha, F. A., Xu, F., Zeng, Y., & Taha, W. (2015, August). Using rigorous simulation to support ISO 26262 hazard analysis and risk assessment. In High Performance Computing and Communications (HPCC), 2015 IEEE 7th International Symposium on Cyberspace Safety and Security (CSS), 2015 IEEE 12th International Conferenc on Embedded Software and Systems (ICESS), 2015 IEEE 17th International Conference on (pp. 1093-1096). IEEE. Chicago Duracz, A. (2016). Rigorous Simulation: Its Theory and Applications (Doctoral dissertation, Halmstad University Press).
Prerequisites	Cyber-Physical System Course
Time frame	Six months
Supervisor(s)	Supervision: Walid Taha, Tony Larsson, and Maben Rabi
Programme	EIS Masters 30 hp
Examiner	Tomas Nordstrom
Signatures	*Student(s):* *Supervisor(s):* *Examiner:*