

**ECE 5734**

Embedded Systems Verification & Validation

**Project on**

VERIFICATION OF SAFETY AND SECURITY REQUIREMENTS IN AUTONOMOUS VEHICLE

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**Abstract**

An autonomous vehicle system is more complex, involving the interaction of onboard intelligent computing systems, a range of sensors, radars, and electromechanical parts. Society of Automotive Engineers (SAE) has defined various standards to define the automation level of vehicles. Based on the standards and levels defined, an autonomous vehicle can perform an entire or part of the Dynamic Driving Task (DDT). The self-driving transportation system should be designed to operate without human interference, in coordination with perception, decision & control, and vehicle platform manipulation functions based on both the internal system and external environment. Modeling an autonomous vehicle must include safety and security as the two inter-dependent properties to protect the vehicle and environment from accidental failures and intentional attacks.

The objective of the project is to develop and verify the functional requirements of the autonomous vehicle systems model developed using the LabVIEW simulation tool. The autonomous vehicle model is designed based on the functions and the sub-functions required for integrating safety and security. The requirements for the system centered towards safety measures such as automatic braking system, accidental failure, and hazard analysis are to be identified and added to the developed vehicle model. The selection of safety and security requirement metrics are defined reliant on the automation level defined by the international SAE standards. The project aims at verification and validation of requirements of the safety process based on hazard analysis and risk assessment, and requirements for threat analysis and risk assessment in the security process of a fully autonomous vehicle. The model targets incorporating safety and security countermeasures to ensure consistency of the autonomous transportation system.