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A simulation approach for increased safety in advanced C-ITS scenarios

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Abstract

With the developments in different areas like Wireless Communication Networks and sensors, as well as, the recent evolution on various topics on Computing, Cooperative Intelligent Transportation Systems (C-ITSs) became a hot topic for research, and are expected to be increasingly deployed in the future. From the different possible scenarios, in this thesis, we focus in analyzing Cooperative Platooning and particularly, in enabling a set of simulation tools capable of encompassing the supporting Vehicle-to-Everything (V2X) communications guaranteed by the ETSI ITS-G5, the most widely accepted European standard on the automotive industry for these kind of communications. Therefore this thesis presents the development of two co-simulation tools for analysis of C-ITS scenarios using Vehicle-to-Vehicle (V2V) communications. First, COPADRIve is a co-simulation tool joining together a network simulator and a robotic simulator. The other co-simulation tool, uses a hardware-in-the-loop approach one bridging a robotic simulator with real communications via On-Board-Units (OBUs). Both tools were developed and used as the means to test and analyze Platooning scenarios and software components relevant in such applications, importantly. These tools were developed in line with the R&D European Projects SafeCOP and ENABLE-S3, where CISTER was an active participant.