The paper introduces the cooperative driving systems by discussing about the increasing demands of road transportation and the capacity of the existing road networks. The cooperative driving system is mainly about minimizing the vehicles’ distances on the condition of mutual communications between cars in order to attenuate the problem of limited road network capacity.

Before verifying effectiveness of the system, the paper states the different road scenarios of implementing the GCDC. The system is applied in a Volvo S60. Its real-time platform interacts with the vehicle and the hardware module. The architecture of the platform consists of controller, platoon logic, sensor fusion, supervisor and world awareness. The paper then demonstrates the communication protocols of the system. Sensor fusion is implemented in the system to gather information from different sensors. The algorithm of sensor fusion is designed on the basis of the limitations of different sensors and their complement with others. In the following section, the paper discusses the constraints for control system and its corresponding control scheme. Finally, the effectiveness of the cooperative system has been verified through experiments and simulations. The paper also presents the setting and results for simulation and experiment, thus proves that the technique can effectively control the vehicle in the platoon of the experiment. Due to the time limit for the competition, a string-stable platoon using the linear controller with less parameters is implemented instead of the MPC design.