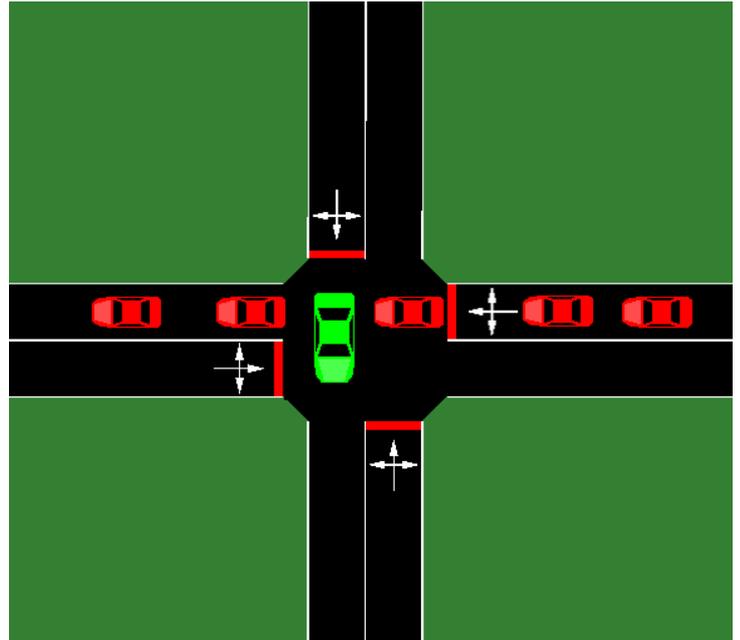


## Bachelor Thesis

# Cooperative Collision Avoidance at Intersections for Platoons

Vehicle platooning means a convoy or a platoon of vehicles travelling in close co-ordination under fully automated longitudinal and lateral control. In general, a platoon has a leader which is responsible for setting the trajectory and speed for all vehicles in the platoon. All other vehicles in the platoon are following one another with a very small headway spacing and they are linked to each other through control mechanisms. Due to the advantages of platooning, a platoon should be destroyed if absolutely necessary to have the greatest impact in terms of road utilization, used air drag, and safety.

Our research is focused on federal highways and urban platooning. This thesis especially focusses on cooperative collision avoidance at intersections for platoons.



A cooperative collision avoidance system is used to organize vehicles in such a way, that potential collisions are detected and avoided by performing according actions like braking or accelerating.

## ■ Goals of the thesis

In the scope of this thesis we want to investigate whether it is possible to slightly adjust the platoon's properties to make an intersection more efficient. The basic idea is to increase the headway spacing between two cars in the platoon at an intersection to open a gap. This gap is created according to the beacon information from other cars, which are going to pass the intersection from other directions. Such a dedicated gap for a vehicle might allow vehicles from another direction to pass the intersection through that gap in the platoon.

For this, different approaches shall be implemented using OMNeT++, Veins and SUMO. All approaches are later checked for their impact on the intersection and on the platoon. Different implementations shall be compared with each other later. Consequently, different parameters to measure the intersection, traffic and the platoon properties will be used.

## ■ Keywords

C++, Platooning, Collision Avoidance, Network Simulation, Vehicular Networking