

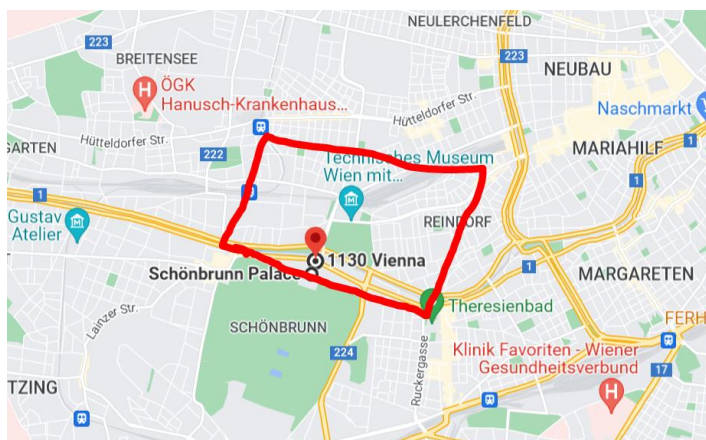
Assignment: Vienna C-ITS Congestion Charge

The Schonbrunn Palace is Vienna's most popular tourist attraction and was originally the summer residence of the Habsburg emperor and empress. Its gardens cover an area of over one square kilometre on the outskirts of Vienna and is home to the world's oldest Zoo amongst other attractions. The palace receives at least 3 million visitors each year, many of whom arrive by tour bus. The palace is situated off the A1 motorway which is one of the main routes in to Vienna from the west.

Now the City of Vienna would like to restrict the volume of traffic in the vicinity of the palace and encourage more visitors to arrive by public transport rather than taking private tour busses. The objectives are to reduce congestion, improve the air quality and make a bit of money for public services by implementing a Congestion Charge based on C-ITS technology.*



The Congestion Zone will extend for a distance of 1km x 1km in front of the Schonbrunn main gates.



Your assignment is to simulate the operation of this C-ITS Congestion Charge System using CANoe.Car2x.

1. Use the sample configuration on Moodle as the starting point for your simulation.
2. Use the Scenario Manager to simulate the movement of at least 10 vehicles in and around the congestion charge zone. Include a mixture of busses and cars.
3. Simulate a Road Side Unit (RSU) situated at the gates of the Schonbrunn Palace which monitors vehicles entering and leaving the zone and records the charge for each vehicle which will be billed monthly to the vehicle owners.
4. A vehicle pays the congestion charge each time it enters the zone. Cars pay 10 Euro and busses pay 50 Euro.
5. Implement a CANoe panel that displays the following information:
 - a. Current number of vehicles inside the zone.
 - b. Total revenue earned so far from congestion charges.
 - c. If possible show the total charge per vehicle.
 - d. Record the total charge per vehicle to a file when the simulation is stopped.
6. Have the RSU transmit a suitable DENM message every 10 seconds indicate the current traffic situation within the zone, for example, high or low traffic density.
7. You can create separate scenario files to test your RSU logic and load them using the Scenario Manager.
8. Draw a red box showing the zone perimeter on the MAP window in CANoe.
9. Simulate at least three other Road Hazard situations with your vehicles and explain how the use of CAM/DENM messages might avert an accident.

Deliverables

1. PDF Design Report
 - a. Describe the content of both CAM and DENM messages and describe three examples of how their use may avert a road accident.
 - b. Document the development of your RSU node explaining
 - i. Its functionality.
 - ii. Its CAPL code design.
2. CANoe Configuration files in ZIP format.

Please upload both files to Moodle.

This assignment forms 60% of the module grade.

Marking Scheme:

CAM/DENM description – 5%

Scenario Development – 35%

RSU CAPL application – 50%

User Interface – 10%

**none of this is true!*