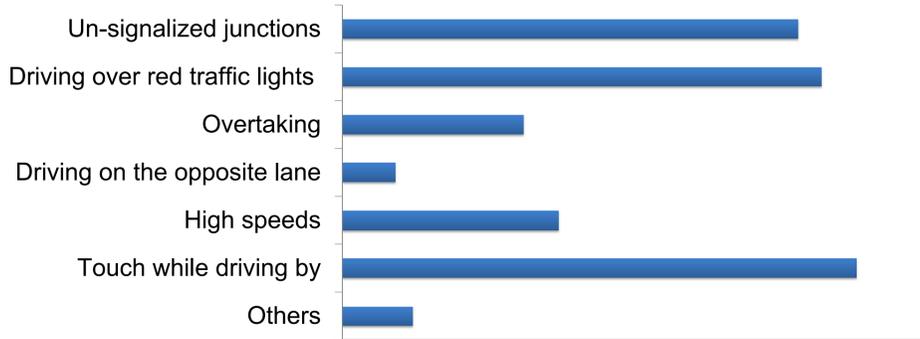


MOTIVATION

Challenges for rescue services, fire brigades and police authorities are **(1) high number of accidents** during driving with special privileges and rights of way and **(2) insufficient compliance with response times**.



Accident Frequency during rescue service operations, Bockting, Stephan:
 Verkehrsunfallanalyse bei der Nutzung von Sonder- und Wegerechten gemäß StVO. Berufsgenossenschaft für
 Gesundheitsdienst und Wohlfahrtspflege - BGW, 2007

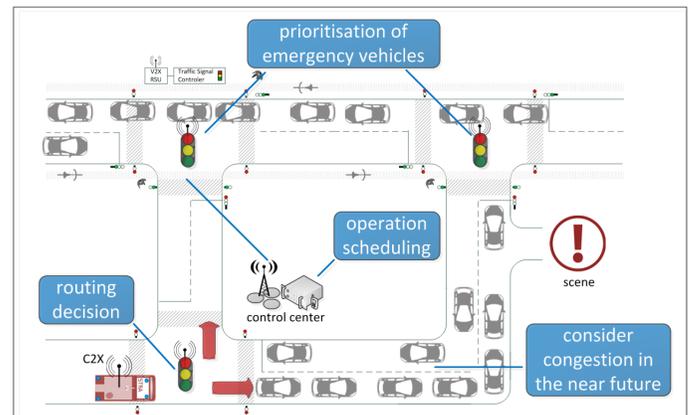


Exceedance of response times due to dense traffic, image: https://commons.wikimedia.org/wiki/File:Ambulans_w_korku.jpg

APPROACH

The project's aim is to significantly improve and secure travel paths of emergency vehicles through technological optimisations. For this purpose, the routing of emergency forces is being optimised and two approaches for prioritising emergency vehicles at signalised intersections are being developed, simulated and evaluated. For this, the following approach is being used:

1. Estimation of current traffic situation and forecast.
2. Consideration of current and near-future traffic signal timings.
3. Consideration of available operational vehicles and their current location.
4. Calculation of optimal and safe route and appropriate traffic signal programs.
5. Tracking of operational vehicles and seamless adjustment of traffic signal timings by using C2X communication technologies.



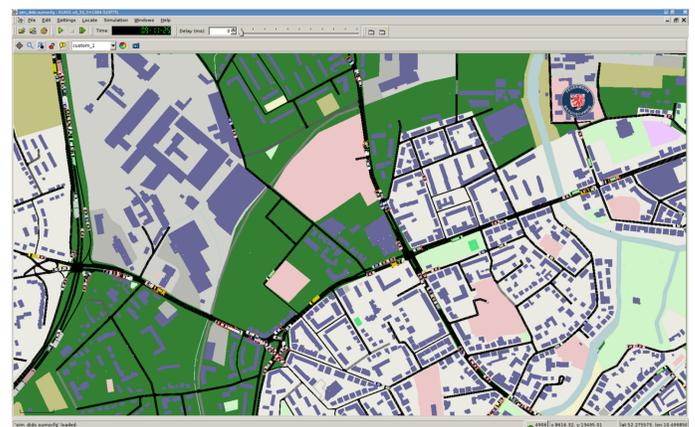
Pre-emption through C2X communication technologies and traffic state forecast

FIELD TESTS

The procedures are tested in two test fields together with the project partners and relevant end user organisations:

- The test field in Magdeburg focuses on the functionality of optimal routing.
- The test field in Braunschweig is part of DLR's intelligent mobility application platform (AIM) and will be extended by a corridor to the district "Braunschweig-Weststadt" as part of the project. It focuses on the investigation and demonstration of two methods for actuating traffic lights for emergency vehicles (centralised and decentralized approach).

The test field Braunschweig and the developed SIRENE system are being simulated in the SUMO traffic simulation to ensure error-free operation and correct overall system functionality.



Simulation of test field in Braunschweig in SUMO

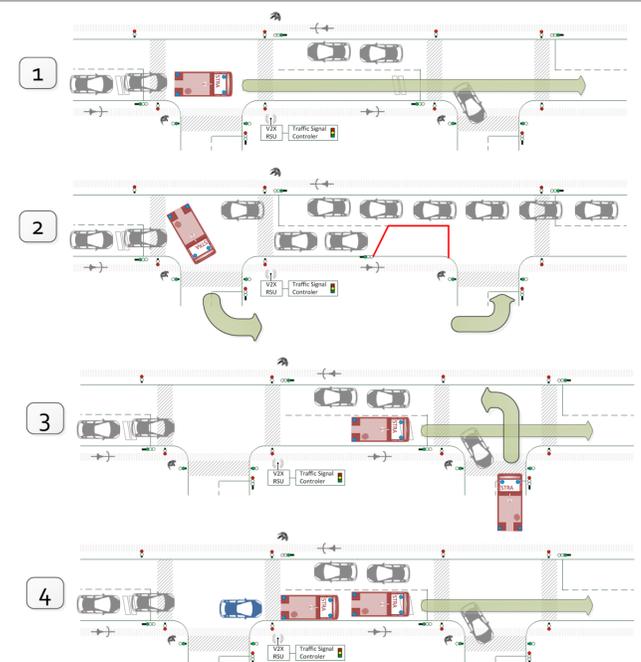
VALIDATION

In close cooperation with end users (such as fire brigades in Braunschweig und Magdeburg), detailed use cases and system requirements were identified:

1. Green wave scenario
2. Intelligent route guidance
3. Priority assessment scenario
4. Convoy operations

The validation is carried out with the following performance measures:

- Number of accidents and potentially dangerous situations (near misses etc.)
- Evaluation of city-wide response times
- Evaluation of delay times and number of stops of individual and commercial transport



Schematic representation of defined use cases