Impact analysis of additional ambulance vehicle beacons
A preliminary study on ambulance vehicles of the Bavarian Red Cross (BRK)

Motivation and Objective
- Emergency vehicles more often than average involved in crashes
- Most crashes appear at intersections in urban areas
- Optical conspicuousness implies higher safety [1]

Purpose of study: Examine Additional beacon (fig. 1.) regarding the effect on safety of maneuvering conflicting drivers

Approach and Implementation

Camera-based traffic observation
- Fixed look at exit of station, 14 days (4-5 h/d)
- In total 51 emergency drives, thereof 13 with additional beacons

Trajectory-based analysis of behaviour of road users. Indicators:
- Maximum deceleration
- Position and time of braking
- Velocity on entering detection area
- Position and time, when vehicle has reached walking speed

Results
- Data indicates earlier perception of ambulance vehicle with additional beacons:
  - Road users enter detection range slowlier, probably due to prior braking
  - Road users on average brake 3.5 m earlier, less intensely and reach walking speed 4 m earlier

<table>
<thead>
<tr>
<th>Additional beacon</th>
<th>$v_0$ [m/s]</th>
<th>Max deceleration [m/s²]</th>
<th>Position of braking entry [m]</th>
<th>Position of reaching walking pace [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>8.22</td>
<td>2.11</td>
<td>8.13</td>
<td>15.95</td>
</tr>
<tr>
<td>H2</td>
<td>8.16</td>
<td>2.03</td>
<td>8.00</td>
<td>12.21</td>
</tr>
</tbody>
</table>

Tab. 1: Mean values of indicators

Outlook
- Larger samples for more statistical significant results
- Use of Surrogate Safety Measures considered (interactions with ambulance vehicle)
- Urban intersections as observation sites