"Blue light" simulators for driver training and for 5G "Emergency Vehicle Approaching" warnings

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Driver and vehicle group
Emergency and rescue services is riskful

<table>
<thead>
<tr>
<th>Police vehicle damage (Sweden, SEK)</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIT* manouevres</td>
<td>196</td>
<td>276</td>
<td>314</td>
<td>316</td>
<td>345</td>
</tr>
<tr>
<td>Cost (PIT)</td>
<td>8 425 166</td>
<td>10 291 811</td>
<td>12 606 430</td>
<td>12 984 906</td>
<td>15 576 793</td>
</tr>
<tr>
<td># damages</td>
<td>4771</td>
<td>4819</td>
<td>4904</td>
<td>4931</td>
<td>5105</td>
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<tr>
<td>Damage cost</td>
<td>57 902 774</td>
<td>56 027 009</td>
<td>62 981 290</td>
<td>59 229 373</td>
<td>61 500 611</td>
</tr>
</tbody>
</table>

* Pursuit Intervention Technique
Risky business
Risky business (courtesy of AISAB)
Who is affected?

Emergency and rescue service personnel
Other road users
Those expecting help by the actual mission
Society (costs, suffering)

Potential for improvement!

• Simulator-based driver training
• Early warnings for ”Emergency Vehicle Approaching” (EVA)
Simulator-based driver training

Advantages
- Well-established (flight and train industry)
- Cost-efficient
- Allows for repetition, individualisation, group exercises
- Improve awareness of your own limitations

Downsides
- Lack of realism (visually, response-wise etc.)
- Suspension of disbelief, however, works!
- Certain types of training, however, is better done on real roads
Reality does not allow…

- Mistakes
- Repetition
- Demonstration
- Feedback in real time…

… but this is possible in a simulated world!
ITS-based warning systems

- Emergency Vehicle Approaching
- Emergency/crash site under establishment
- May
  - Save lives
  - Improve working environment
  - Prevent congestion or queues (re-direction/alternate routing)
  - Reduce stress and accident risk in other road users

Techniques
- RDS (EVA-M)
- 5G
- Short-range and ad-hoc networking
"Nordic Way 2" – interoperable 5G messaging

6,5 M€ EU project
Road admin. in Norway, Sweden, Denmark & Finland
5G "interchange nodes"
- implemented and deployed
Demonstrate services for
- Connected traffic lights
- Hazards, Warnings
- "Emergency Vehicle Approaching" as one use case
"Emergency Vehicle Approaching" in short

"EVA" msg affecting traffic

- Emergency personnel view and actions
- Traffic control + interface
- Vehicle driver view and HMI
Simulator set-ups for emergency driving

Sim II, truck/fire engine moving base

Sim III, ambulance/police moving base

Sim IV, moving base

Transportable
Simulated scenarios with ”human-in-the-loop”
User-centered development
QUESTIONS?