



Perspectives in functional roadmapping

Date 17/02/2016
Ministry of Transport, Prague



Focus of Workshop



- Public Transport
- Vulnerable Road Users
- Non Safety

Public Transport



- BUS/Tram
 - Stopping
 - Starting
 - Turning Left/right
- Tram Warning
- Tram Interlocking control
- Blind-Spot detection (Avoid collisions with cycles and pedestrians)
- Localisation of Vehicles
- Use of C-ITS to improve inter-modal transport

Public Transport



- Special needs passenger indication at stop
- Request for Bus/Tram to stop
- Fleet management e.g. for Waste collection, public services etc.
- Vehicle management (at garage)
- ? CBTC for Urban Rail
- Priority at Traffic Lights / GLOSA
 - Known service so why ETSI G5
 - Some existing radio solutions old and doubtful quality
 - Synergy across services
 - Might replace other traffic sensors

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Vulnerable Road Users



- What are Vulnerable Road Users (VRU)?
In the first place all Humans participating road transportation and who have less protections then sitting in a Car or Truck.
- During the workshop it was proposed that also animals should be seen as VRU. Especially in the Nordic countries this situation is rather common. Herds are GPS tracked.

Vulnerable Road Users

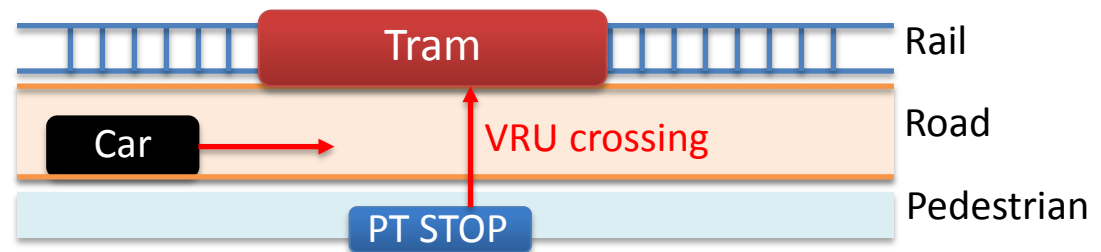


- Recognized Public Transport oriented use cases (1)
 - Pedestrian crossing road in front or rear of bus while vehicles, or other VRU's are passing by at bus stop.
 - Bus detects pedestrian(s) crossing and warns passing road users for this event.
 - Bus detects pedestrian(s) crossing and warns pedestrian(s) for passing road users in case they are there.
 - Bus situation awareness for disabled (blind and others) at bus stop.
 - Bus capabilities (wheelchair,..)
 - Which bus is stopping where (at a multi bus-line stop area). Where to go and how much time left.

Vulnerable Road Users



- Recognized Public Transport (PT) oriented use cases (2)
 - Pedestrian crossing a road, in between the waiting area and physical location to get onto a bus, tram or trolley.
 - The bus, tram or trolley detects the availability of people who would like to get on the bus and sends out a warning to passing traffic at a stop (when there is other traffic).



Vulnerable Road Users

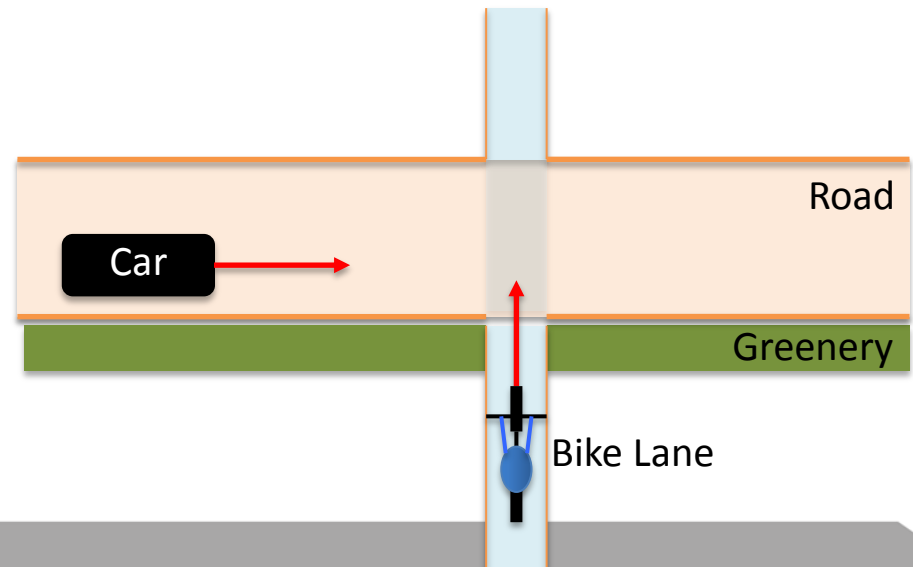


- Virtual Pedestrian Road crossing use case
 - At specific or non specific times groups of people (including school classes of children) need to cross a road without any real pedestrian or cyclist crossing in the neighborhood.
 - pedestrians or cyclists intending to cross have a device equipped to send out warnings and actively sends out the warning on initiative of the pedestrian or cyclist it self.
 - A roadside unit detects the pedestrians or cyclists intending to cross and sends out an warning to passing other road users. Detection could be done by a knob to push or by visual recognitions (camera or infrared).

Vulnerable Road Users



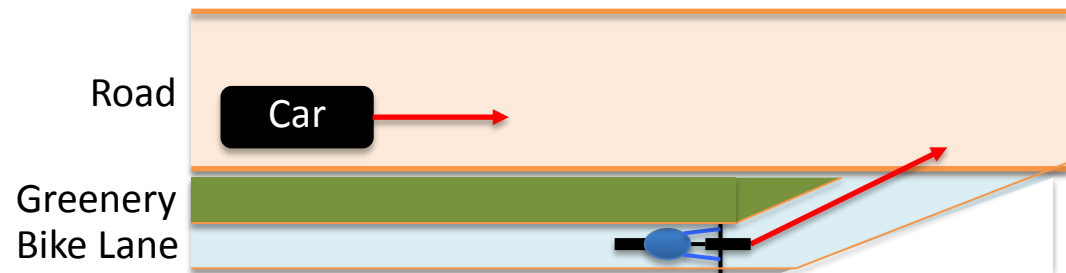
- Bike lane change and an equal crossing use case(s)
 - Bike approaching crossing warning.
 - Bike sends out an awareness or an driver initiated warning at crossing.
 - RSU detects a bike and sends a bicycle approaching warning (could also send and car approaching warning).
 - Car CAM is detected by bike and bike application warns the bicyclist.



Vulnerable Road Users



- Bike lane change and an equal crossing use case(s)
 - Bike lane ends, bikes on normal road.
 - RSU detects a bike approaching and sends bicycle entering the road warning. RSU can also send a traffic at bike lane/road merge warning
 - Bicyclist indicates going onto normal road and sends a warning



Vulnerable Road Users



- Other Bicycle oriented use cases
 - Bicycle priority, CLOSA
 - Bicycle has beacon (sends awareness message)
 - Bicycle sends request for crossing (sends an request)
 - RSU sensors detects bicycle and provides time to green information to the bicycle(s).

Note: an RSU may include specific algorithms of grouping multiple cyclists and providing priority to groups of cyclists.
 - Bicycle Slippery road
 - Bicycle can receive slippery road information by Car's passing by.
 - Bicycles may detect slippery road themselves and provide related information to others.

VRU solutions



- Bike sharing service to include
 - With integrated PDA/mobile phone to provide
 - Commercial services including locations of interest.
 - Public services such as tourism and public locations and events
 - Safety services such as
 - static road situation awareness.
 - Dynamic warnings such as described earlier in the slides.
 - Including support for disables like with limited hearing.
- Bike CAM uplink to Cloud
 - Bicycle CAM's through Mobile network to cloud and from there to Vehicles

Non-Safety



- SmartCities
 - City-Profile installation (e.g. speed limitations, ...) and Pay-per-Use Transactions (Payment Information and Operations which are City-specific)
 - City-Tolling
 - Parking
 - „Attractions“
 - Road-Quality-Measurements
 - Pre-Ordering/Reservations (e.g. DriveIn, ...)

Non-Safety



- SmartHome
 - Use vehicles as Energy-Sources (e.g. E-Vehicles)
 - Synchronize with other vehicles to intelligently use free garages/parking possibilities
- Gamification
 - Assurance reduction (be awarded “cooperative” points by other traffic participants when being cooperative)
 - Emission-Bonus/Payment (awarded/invoiced by cities for driving within a specific city-limit)
 - Intelligent Green-Phases