Introduction: Assistance Road Projections

**Driver Assistance Projections**

GTB Presentation to support informal document GRE-82-04
Introduction

Review: Following on from GRE-81-23 – GTB Activity Report

• One of the main GTB working areas is: **New Lighting Functions**

• GTB has initiated and supported independent research studies by universities and institutes to investigate if a new function provides safety benefits, is a comfort feature and provides important information to the driver and to other road users.

• The studies also investigate whether a new function is disturbing or confusing other road users.

• Two topics from the research studies are **communication** and **driver assistance**.
Agenda

1. High resolution adaptive front lighting systems
   Driver Assistance Road Projections
   a) Concepts
   b) Results of scientific studies

2. Demonstration
   Assistance Road Projections under real driving conditions,
   from 7:00 pm (3 test cars available)
High Resolution Technology
Assistance Road Projections

high resolution matrix (additional): 20,000 ... 1,3 Mio pixels

assistance road projection area

base light

standard matrix light
High Resolution Technology
Assistance Road Projections

- **base light**
- **standard matrix light**
- **high resolution matrix (additional): 20,000 ... 1.3 Mio pixels**
The idea of road projections is not new!

"....guidelines indicating the width of the car..."
Examples for Assistance Road Projections

1. guiding elements
2. collision warning
3. speed limit warning
4. view of oncoming driver

Introduction: Assistance Road Projections
Driver Assistance Projections

- Driver assistance road projections: To assist the driver of the system vehicle in preventing or solving specific traffic situations or conditions, without negatively affecting any other road user.

- Already a batch of studies has been carried out from 2016 - 2019
Research on Road Projection Applications

Status: September 2019

Budanov, M., Prof. Dr. Cornelius Neumann, Karlsruhe Institute of Technology:

Budanov, M., Prof. Dr. Cornelius Neumann, Karlsruhe Institute of Technology:
**Success of Driver Assistance through Light Projections on the Road**, ISAL Symposium, Darmstadt, 2019.

Budanov, M., Prof. Dr. Cornelius Neumann, Karlsruhe Institute of Technology:


Introduction: Assistance Road Projections
Aspects investigated in the field tests:

- **Distraction potential for other road users** by assistance road projections

- **Effect of guideline projections on the driving behaviour**

- **Glare investigation on wet roads** by assistance road projections

- **Warning effectiveness** (collision warning, ice warning, ...) by assistance road projections
Scientific Investigations (TU Darmstadt, 2017)
Potential for Driver Distraction by Road Projections

road projections:
- snow flake (ice warning)
- construction zone warning
- guidelines for construction zones

test subject:
Fixation-behaviour, -time (eye mark camera)

Result: „The investigated assistance road projections have no significant influence on the fixation behavior of other drivers and do not lead to distraction of other road users.“

Introduction: Assistance Road Projections
Driver Assistance Road Projections
Studies and Benefits (Karlsruhe Institute of Technology)

Result: Driver are supported by the road projection to a more confident way of driving.

Driving behaviour: Analysis of steering wheel amplitude, speed, etc.

Subjective rating of test subjects
Assistance Road Projections
Field of Assistance Road Projections

Assistance Road Projections:
- Usage as assistance function
- Restricted area along the car’s trajectory
- Limited maximum intensity

-1° ≈ 40 m distance in front of the car
2. Demonstration

Invitation to system demonstration

Demonstration: Road projections under real driving conditions

October 22, 2019, 7:00 pm (3 test cars available):
Audi, Mercedes, Automotive Lighting

Introduction: Assistance Road Projections

shuttle service:
- start at 7 pm
- every 45 min
2. Meeting Point

Les Brasseurs
Bière artisanale & Restaurant brasserie

Place de Cornavin 20, 1201 Genève
2. Demonstration

**Invitation to system demonstration**

**Demonstration:** Road projections under real driving conditions

Geneva: October 22, 2019  7:00 pm  (3 test cars available)

**Demonstration: Assistance Road Projections**
Meeting point: “Les Brasseurs”
each group with 6 people
Total time: about 1 h 15 min

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democar with DMD projector system for road projections
Thank you for your kind attention.