RAIN VISION

ROADS THAT CARS CAN READ

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EuroRAP
EUROPEAN ROAD ASSESSMENT PROGRAMME

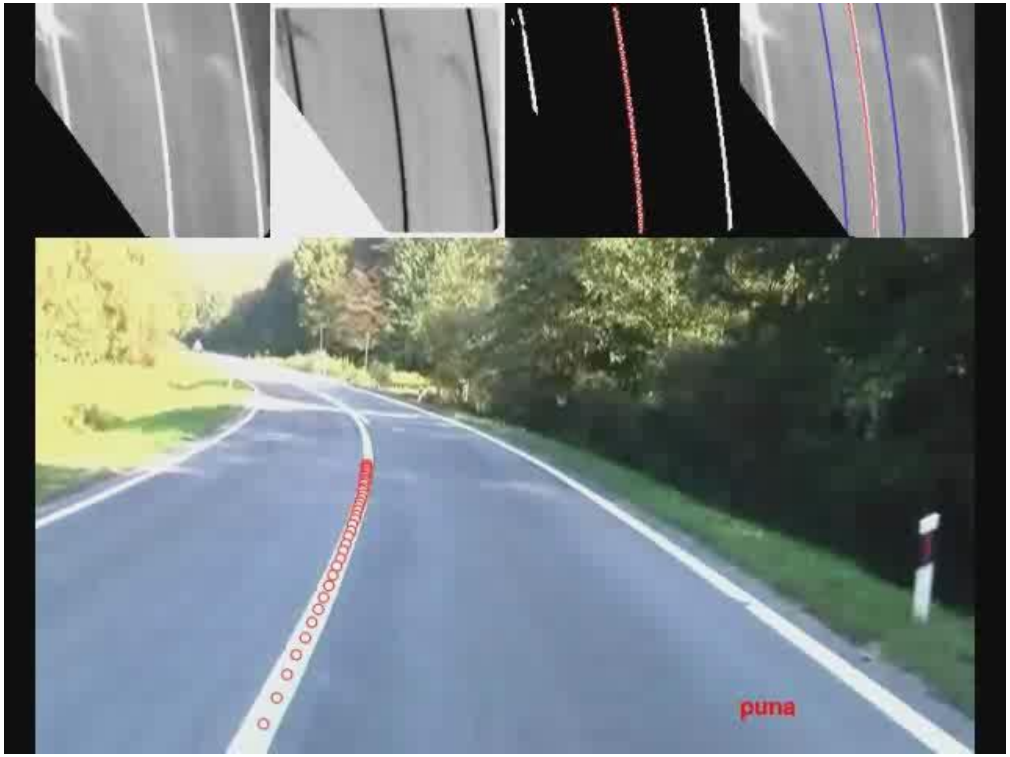
European Commission
Mobility & Transport

By 2025....

1) 50% self-steering vehicles through LKA or similar

2) Quality and consistency in signs and markings for safe driving

3) Directive 2008/96/EC revised and fully effective



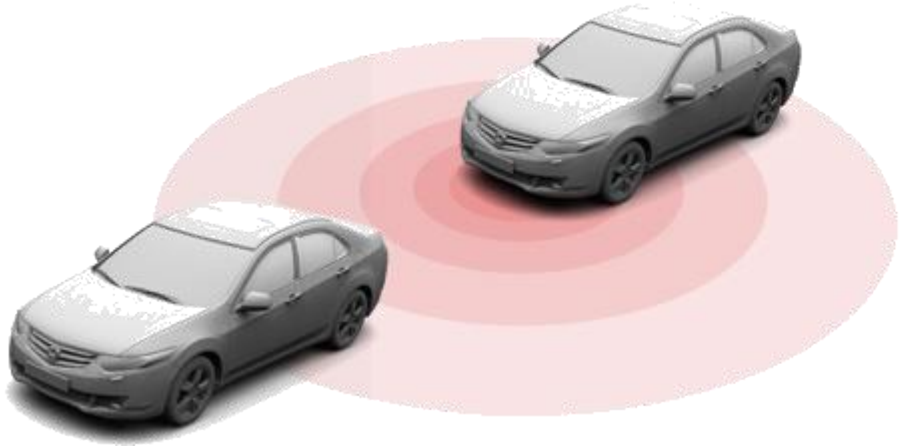
“White lines are the rails of the self-steering car”

Reading the Road

Some newer technologies:

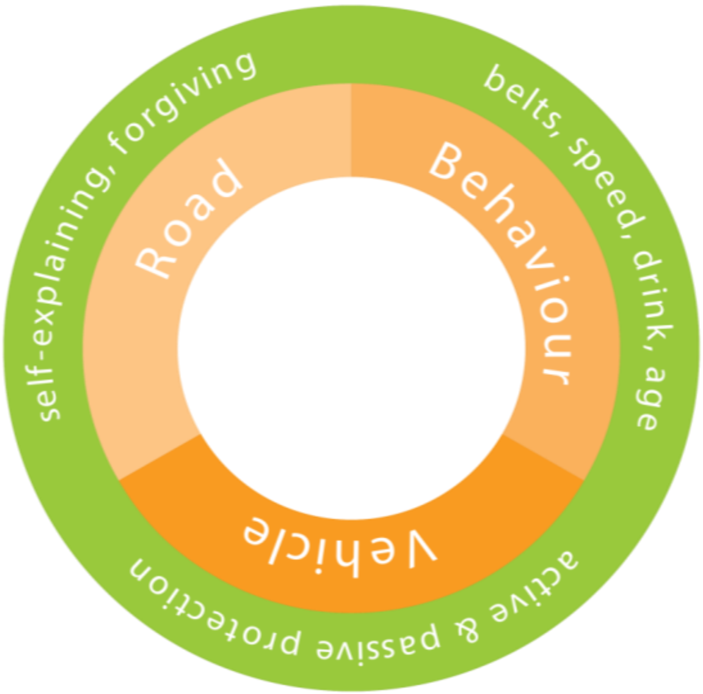
- *Lane keep assist/active lane keeping*
- *Intelligent speed adaptation*
- *Automatic sign recognition*
    - *Speed limits*
    - *Warning signs*

…



Towards Zero

Safe System Design - complementary action on roads, vehicles and behaviour to create 'normal driving' envelope



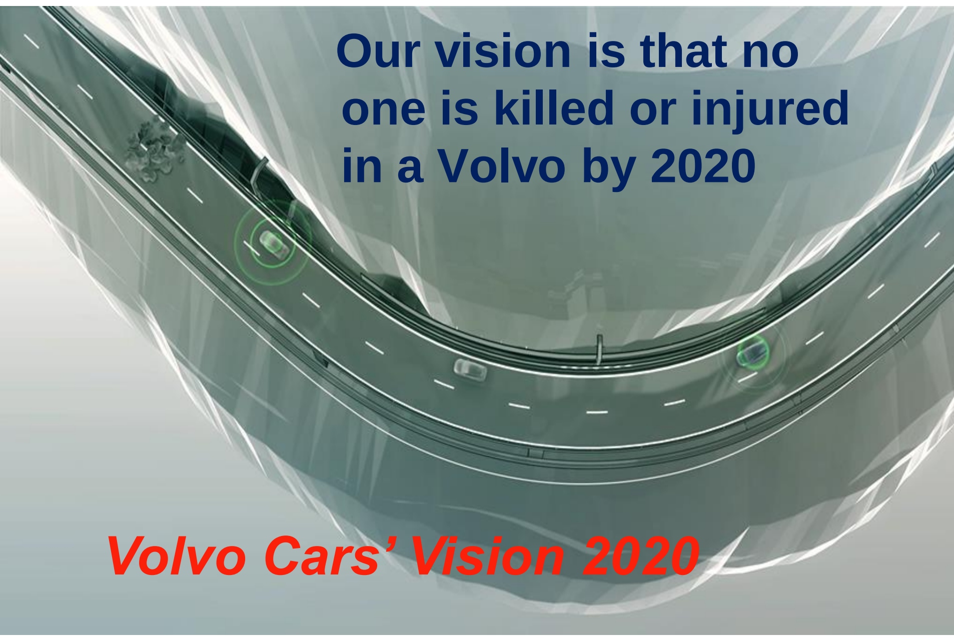
5-star roads

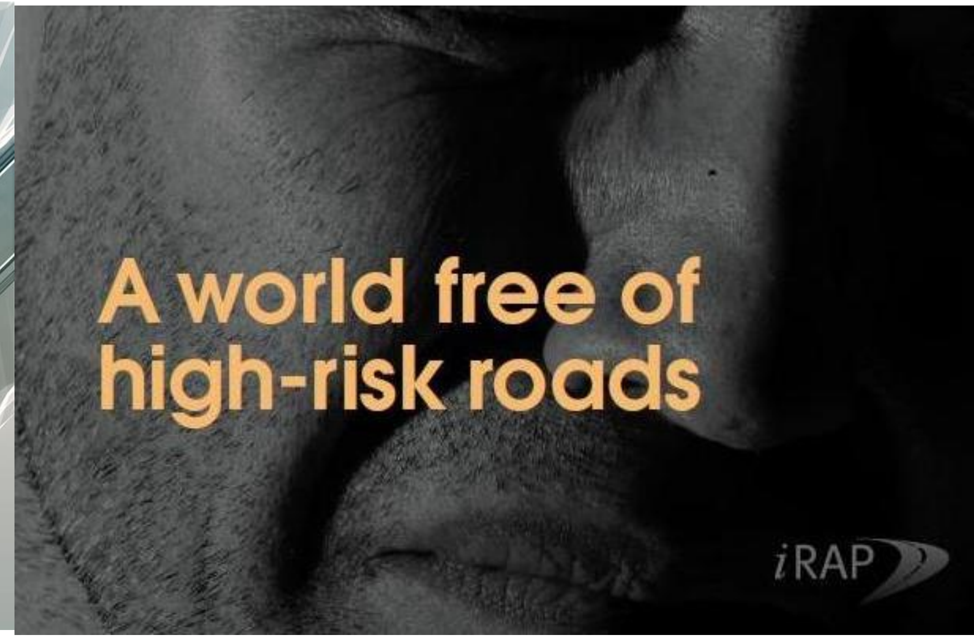
5-star cars

5-star drivers

Drivers make mistakes - 1 in 500 driving decisions

Two Worlds Becoming One





Road Assessment Programmes:

Vision: a world free of high risk roads

Active in 70+ countries

700,000km + assessed

iRAP

EuroRAP AusRAP usRAP KiwiRAP ChinaRAP

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About EuroRAP

EuroRAP EUROPEAN ROAD SAFETY ATLAS 2011

Key statistics

35,000 killed on roads across Europe annually

95 killed on Europes roads every day

240,000km Total length of roads risk mapped and star rated in the atlas

23 countries with EuroRAP safety ratings

68% of fatal crashes on the network mapped occurred on single carriageways

A quarter of fatal crashes on the network mapped occurred on motorways

Risk Mapping

180,000km Total length of roads risk mapped

4 in 10 roads risk mapped have unacceptably high risk

2 in 10 roads risk mapped are rated as low risk

Motorways are the safest road type, with 99% rated as lower risk

4 times the risk of a fatal crash on single carriageways compared to motorways

1.25 times the risk of a fatal crash on dual carriageways compared with motorways

Netherlands has the lowest average risk rate at 2 fatal crashes per billion vehicle km

Great Britain has the safest motorways and dual carriageways

Bosnia & Herzegovina has the highest risk single carriageways, and Netherlands the lowest

44% of the dual carriageway network mapped achieve the best possible safety standard

Slovakia has the highest risk dual carriageways

Star Rating

60,000km Total length of roads star rated

27% of the total network star rated scores less than 3-star

Half of the single carriageways rated score 1 or 2 stars for car occupants

Slovenia has the lowest star single carriageways network, with 87% rated 1 or 2 stars

Spain has the highest star single carriageway network, with 72% rated 3 or more stars

One-third of the dual carriageway network rated achieves 4-stars or above

France has the safest dual carriageways, with 95% rated 3 or more stars

Moldova has the poorest dual carriageways with 33% rated 1 or 2 stars

63% of the motorway network star rated achieves a 4-star or above

97% of the motorway network in France is rated 4 or 5 stars

Slovakia has the poorest motorways with almost two-thirds rated as 3 stars or less

20 COUNTRIES RISK MAPPED **180,000kms** COVERED

16 COUNTRIES STAR RATED **60,000kms** COVERED

Country results

Mapping and tracking the safety of roads across Europe

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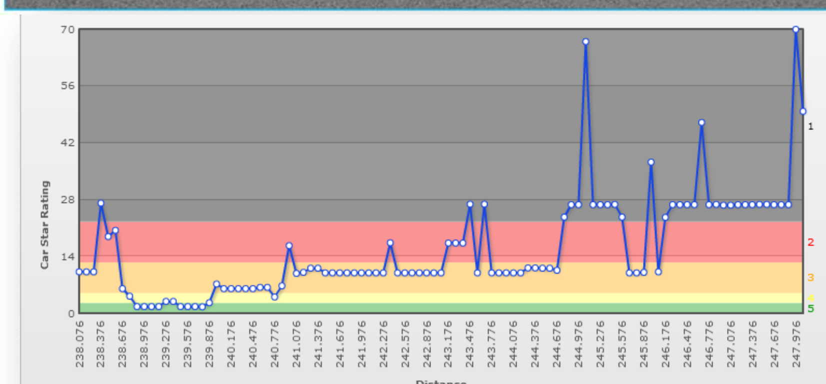
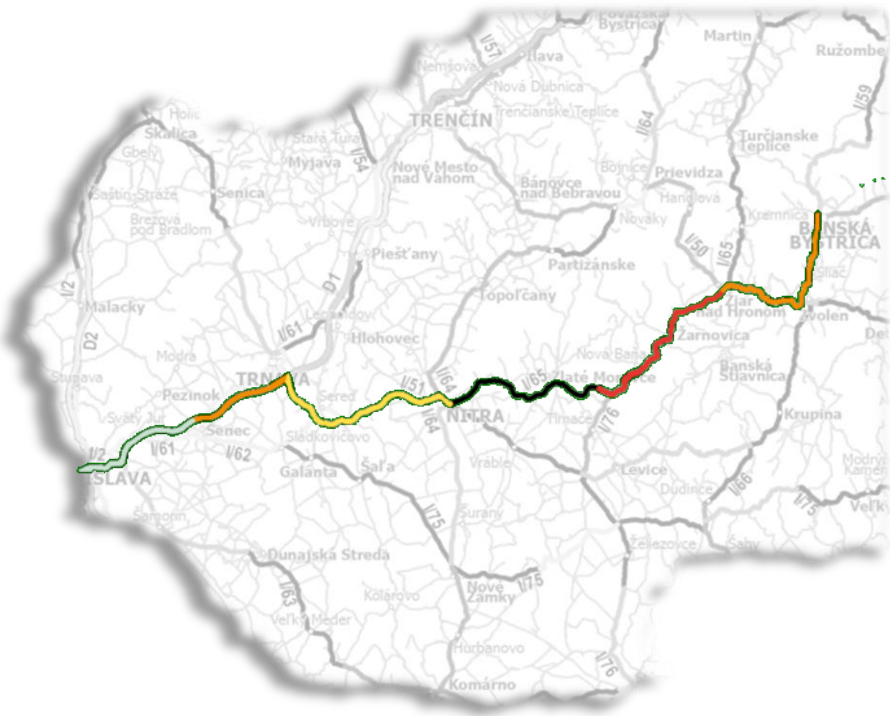
Star Rating Roads



- 54 attributes every 100m define safety risk
- *Roads that Cars can Read* attributes now included (e.g. data from LIDAR)
- Attributes can be included in asset management inspections
- Global supplier network developed

RAP - Measuring Safety



Risk Mapping measures the system – road, vehicle & driver

Star Rating measures the road

Colour coded maps: one language for public, elected members, investors, engineers

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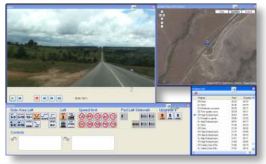
About EuroRAP



Road Survey → Road coding → Star Rating Scores → Star Ratings → Investment plan

- Assessed every 100 meters
- Model based on crash studies from around the world
- Technical oversight of the model provided by iRAP Global Technical Committee

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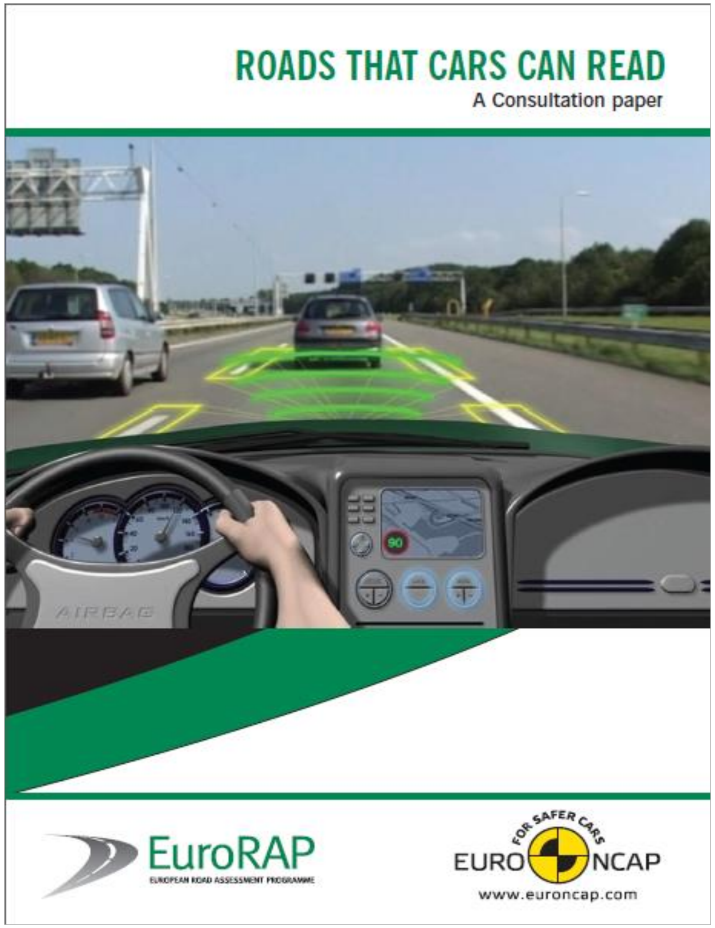
ROADS THAT CARS CAN READ
A Consultation paper

EuroRAP
EUROPEAN ROAD ASSESSMENT PROGRAMME

FOR SAFER CARS
EURO NCAP
www.euroncap.com


INTRODUCTION

1. INTRODUCTION

THE ADOPTION OF THE 'SAFE SYSTEM' AS COMMON INTERNATIONAL POLICY

2. THE ADOPTION OF THE '*SAFE SYSTEM*' AS A COMMON INTERNATIONAL POLICY

2.1 THE *SAFE SYSTEM*

VEHICLES OF TODAY AND TOMORROW

Head-up displays are now at market

4.2 CARS AND SYSTEMS NEAR MARKET

4.3 FAILURE MODES AND LIMITATIONS

Past construction markings still visible

NATIONAL VARIATIONS IN SIGNING AND MARKING: SCOPING SURVEY RESULTS

5. NATIONAL VARIATIONS IN SIGNING AND MARKING: SCOPING SURVEY RESULTS

5.1 THE SCOPING SURVEY

5.2 RESULTS

"*Most countries believe they adhere to the Vienna Convention on Signs but there can be marked variation between countries even on the most common signs*"

5.3 RECOMMENDED SIGNING AND MARKINGS SURVEY

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ROADS THAT CARS CAN READ

Define what motor manufacturers need, and can reasonably expect to have, so that vehicles can read the road reliably

Lane marking & speed sign recognition at or near market

10% of the network carrying majority of traffic & deaths

Sample surveys capturing inventory & variation of signing & marking across borders

Define working tolerances & compare with quality currently achieved

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Main Proposals

1. Start with lane support and speed alert systems
2. Focus on 10% of roads of economic importance

Lane Support Systems

Speed Alert Systems

Main Proposals

3. Establish 2 technical working groups:

   WG1: Define working tolerances needed for roads and cars

   WG2: Execute cross-border reference survey to establish current quality levels and variations

Road Marking Defects


Faded / worn out centre lane markings on approaches to junctions

Differential wear rates on central hatching

Worn ‘give way’ line marking at priority junction

Challenging Roads

- Old markings still visible
- Bitumen seam reflect oncoming light
- White markings in snow
- Weak contrast
- Reflections on wet road
- Non standard markings

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More Challenges

Severe shoulder wear

Obscured signs and text modifications

Pothole damage

Summary: 6 Country Survey

- National interpretations of convention protocols - details vary including colour use, fonts, borders
- Legal frameworks <u>are</u> based on European Standards
- Little/no national quality standards, no central monitoring but some guidance
- Road marking application on similar principles but e.g. broken *vs* solid lines, colours vary

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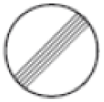
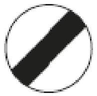
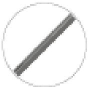
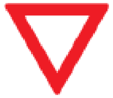
Vienna Convention Variations

ROAD SIGNS	Germany (D)	Great Britain (GB)	Greece (GR)	Netherlands (NL)	Poland (PL)	Serbia (SRB)
Speed limit (maximum speed in mph / kph)						
National speed limit applies	  End of all speed and overtaking restrictions			 End of speed limit  C22b End of closure for lorries not meeting the requirements stated in Article 86d	 End of speed limit  End of prohibition	
Stop (and give way)						
Give way (to traffic on major road)						

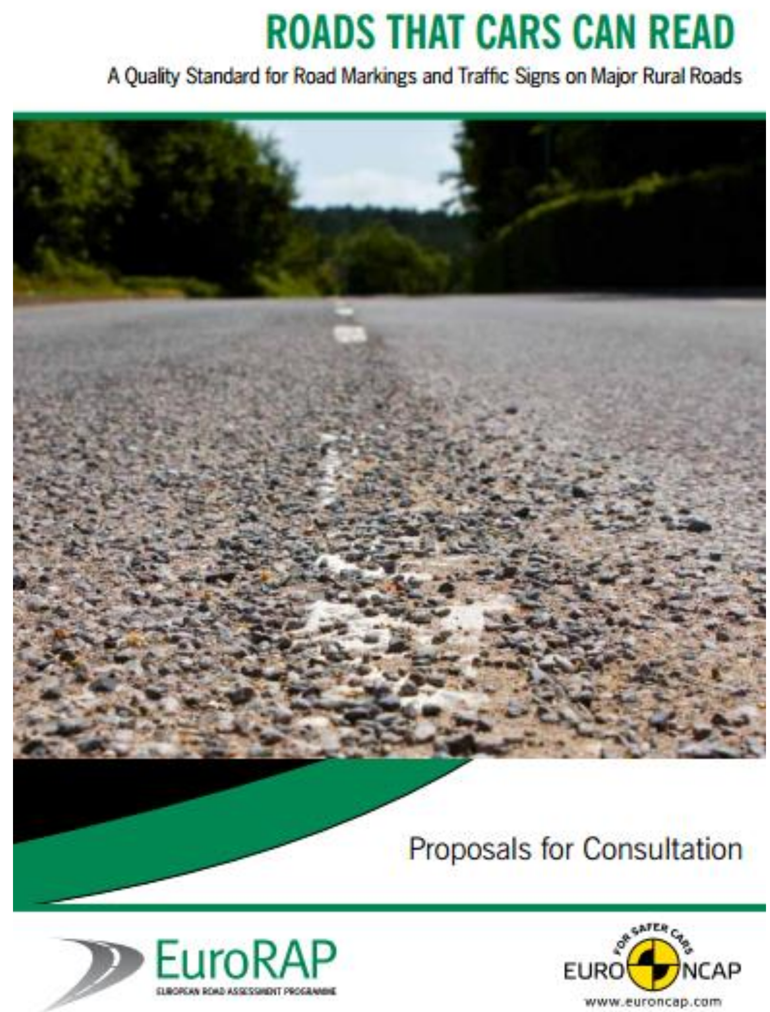
ROADS THAT CARS CAN READ

Summary of technical proposals:

- *"...**draft quality standard** for road signs and markings...*
- *...**readable** by road users and by vehicle-based systems...*
- *...units applied by **both road and vehicle engineers**...*
- *...measurements refer to **international conventions**...*
- *...**independent** of any proprietary system...*
- *... basis for **repeatable international surveys...***
- *...**enables survey of quality** of signs and markings..."*

Proposed Quality Standard

- 2013, EuroRAP/Euro NCAP publish proposals for lane marking
- Based on roads and motor industry working group (ERF and ACEA)
- Key proposal: standard lane marking width and reflectivity
- Commonly used and memorable:
  “150 x 150”



Challenges Across Europe

- Thousands of small authorities managing roads
- Differing in
  - *Logical structure*
  - *Sign layout*
  - *Sign size*
  - *Marking thickness*
  - *Colours used*
  - *Location*

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Thank you !

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