Active safety and automation - testing today and tomorrow

- AstaZero
- Test Scenarios, what will we be testing?
- Technology on the Test Track
- Challenges and new insights
AstaZero

Owned by RISE and Chalmers
Opened 2014
One hour from Göteborg
Four test environments
Dedicated 4G network
R&D – building capabilities
A&V services
EuroNCAP accr. during 2017
Test Scenarios, what will we be testing?

• Current methods mainly based on accident statistics.
  – Win-Win technology and saving lives
  – Today one-go tests

• Moving towards automation
  – Easy for us - difficult for a machine
  – Higher robustness
  – Test systems that will replace the driver!
Test Scenarios, today and in the future

Active safety, based on accident statistics
- OEM/TIER1 R&D activities
- EuroNCAP, etc

Automation, based on ?
- EuroNCAP
- NHTSA
- R79 ACSF (Automatically Commanded Steering Function)
- Regulation... ?
EuroNCAP

• Autonomous emergency braking (AEB)
  – Car-to-Car (CCRs, CCRb, CCRm)
  – VRU (Vulnerable Road User) – pedestrian, bicyclist – poor lighting conditions

• Lateral Support Systems
  – Lane Departure Warning
  – Lane Keeping Assistant
  – Emergency Lane Keep (2018)
EuroNCAP

• Larger amount of test methods 2016->2018
• Adding Grid Scoring System
  – Manufacturer predict results -> test some and score
  – If no prediction all points tested
Automation

NHTSA
• Policy 201609
  – List of normal driving competences
  – Crash avoidance capability, road work etc

UNECE (UN Economic Commission for Europe)
• R79 ACSF (Automatically Commanded Steering Function)
  – Just added Hands-off monitoring
Automation

New sources for scenarios

• Record live traffic / simulations

Much much larger test volume
Indian intersection

https://youtu.be/nVUDFizBLxw
Technology on the Test Track

• The basics for today's active safety testing
  – Repeatability
  – Precision
  – Efficiency

• Performed in "easy" conditions
  – Dry tarmac, max 1% slope
  – No precipitation and good visibility
  – No shadows
Tech on the Track
Tech on the Track

Positioning
Communication
Synch
Illumination
Friction
Tech on the Track

Repeatability
Sensor fidelity
Efficiency
Testing automation

• Increasing number of scenarios
• Increasing complexity of traffic scenarios
  – One off tests and add mission based
• Driver support -> total responsibility!
  – Handle weather
  – Mix of automated, low level automated and manual
  – Slippery roads
  – Handle communication outages, cyber attacks
  – Handle positioning/localization in all conditions
• Simulation/CAE will be vital to handle bulk testing
• Small volume on test track, well chosen
Intersection

https://youtu.be/nYSXvnaNRK4
Challenges and new insights

• Challenges, YES!
• Current active safety requirements and add
  – Poor visibility
  – Add communication, V2X
  – Add more complex traffic scenarios, mission based testing
  – Add gps denial (today gps is used for test safety!)
• Way forward
  – Huge amount of simulations
  – More cooperation and standards
  – Applied research
THE WORLD’S FIRST FULL-SCALE TEST FACILITY FOR TOMORROW’S ACTIVE SAFETY.