Towards a common methodology for automation FOTs and pilots

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Field Operational Tests (FOTs) of automated driving

- Large-scale user tests
- Demonstrate and disseminate the benefits
- Assess
  - Technical performance, system robustness
  - User aspects: driving & travel behaviour, HMI, acceptance
  - Impacts on safety, mobility, environment, efficiency
- Society
- Study deployment potential
- Future recommendations
// Why a common methodology for testing?

• Scientifical rigour is needed to attain proof and valuable results
  – Public funding is for user tests, assessing impacts on transport system
  – Not enough that „my friend tried it and he thinks it‘s fine“
• Systematic approach
  – Tests produce comparable results
  – Tests complement each other
• Guidelines support test preparations and analyses, enable faster work
  – Large-scale testing includes dozens of steps, difficult at first
  – Legal checklists
  – Recommendations for data collection and management
• Common vocabulary
• Methodology can encapsulate lessons learned
FESTA Handbook

- FESTA Handbook covers the time-line and administration of FOTs
  - FOT-Net is a networking platform open to FOT stakeholders and community, with more than 30 participating organisations
- FESTA has been used in all major European FOTs and many internationally
  - General-purpose, but includes specific advice e.g. for ADAS testing
  - Applicable for various types of user trials of new vehicle ICT
  - EU’s input for trilateral work between US-Japan-EU on evaluation framework for automated driving
- Current update round: Data Sharing Framework, first version available
- Collecting requirements to update FESTA regarding automated driving
FOT implementation steps*
   Defining and preparing the study

- Function identification and description: initial review and specifications
- Define general objectives, research questions and test methodology
- Technical assessment goals and simulation plans
- Define and design data logging
  - Define additional data sources, e.g. weather, time tables
- Data management plans (new)
- Guidelines
  - Recruitment
  - Ethical and legal issues, legal agreement checklists
- Plan survey tools and questionnaires

* Adaptation of FESTA implementation plan for presentation purposes
FOT implementation steps
Test site set-up and pre-tests

• Set-up
  – Convene test site team
  – Finalize experimental procedures
  – Plan recruitment and driver incentives, driver training & briefing
  – Final legal agreements
  – Plan communication with stakeholders
  – Obtain or lease equipment
  – Instrument vehicles: sensors, data logging and new functions
  – Set up test site specific data collection and storage

• Pre-tests ("piloting"), as was extended in DRIVE C2X
  – Part 1 - Technical validation
  – Part 2 - First user tests
  – Part 3 - Piloting of analyses
    ➢ Green light for testing?
FOT implementation steps

Test execution and wrap-up

• Execution
  – Recruitment of subjects
  – Driver briefings and interviews
  – User support
  – Data collection including **periodical validation of collected data**
  – Additional technical tests

• Wrap-up
  – Users return systems or take up offers to continue use
  – Decommission systems or continue into operational phase
  – Video annotation by test site
  – Compile final datasets and finalise documentation & metadata*
  – Provision of data for analysis, anonymisation*
  – Data curation and sharing*

* new topics addressed by FOT-Net’s Data Sharing Framework
FOT implementation steps

Analysis

Data analysis steps in FESTA

- Data enrichment and post-processing to generate defined indicators and summaries
- Technical evaluation
- User acceptance
- Impact assessment, e.g. as in DRIVE C2X
  - Impacts on driving and travel behaviour
  - Impacts on safety, mobility, efficiency and environment
- Societal assessment and scaling up of results
Conclusions (1/2)

Automated driving tests from FESTA point-of-view

- FESTA implementation steps remain valid, the process seems the same
- Wider range of impact assessment research questions
  - Automated transport is bigger than wide-spread take-up of a function
    - Eventually brings up topics more commonly related to public transport, e.g. demography, land use, accessibility
    - Value of being able to work or watch a movie while travelling
  - Opinions, reactions and behaviour of other road users
    - Afraid? No eye contact, do we need new warning lights?
- Technology development status sets limitations to naturalistic testing: areas and users
  - FESTA methodology also applies to small-scale & controlled tests
  - For proving the value and reliability of the new technology, there’s a need to go as naturalistic as possible
Conclusions (2/2)

Automated driving tests from FESTA point-of-view

- Data collection
  - Vehicles have capabilities to "annotate" the environment automatically, e.g. classify traffic situations
    - Reduces the likely extreme needs on manual video annotation
  - Not only monitoring of drivers’ eyes, but their pose and activities
  - Detailed driving data needed for comparison against human drivers, e.g. lane keeping behaviour and safety margins, intersection driving

- Recent emphasis on data sharing
  - Anonymisation of GPS and video data
  - FOT-Net’s Data Sharing Framework (FESTA extension)

- Collaboration allows for high-level coordination of test projects and their evaluation activities
  - Collect proof on technical reliability, impacts on driving
  - Harmonisation e.g. between EU-US-Japan
Thank you.

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