Contents

• The euroFOT project
  ‣ Objectives, functions, expected results

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• Lessons learned and conclusions
History

- EU Initiative (2001): Halving fatalities by 2010
  - White paper – ‘European transport policy for 2010: time to decide’
  - Road safety: Road Safety Action Programme (2003-2010)

- Field opE rational teSt supporT Action FESTA 2008
  - Collect and publish how to do a FOT

- Field Operational Tests in FP7 research program
  - Advanced Driver Assistance Systems (euroFOT)
  - Mobile Devices (TeleFOT)
  - FOT-Net

- euroFOT
  - Proposal in Oct 2007, launched by Ford Research Aachen
  - Start in May 2008
  - 40 month duration till August 2011
  - 28 partners, 22 m € budget, 14 m € funding from EC
Why field tests (euroFOT)?

• Intelligent Vehicles have a large potential for safer, cleaner and more efficient transport solutions
• Technologies are mature (several systems in series production)
• Limited data on real-life operation and how drivers use the systems in ordinary traffic
• This restricts our capabilities to improve the systems, understand their impacts and make the right decisions for deployment
euroFOT Objectives

- Perform multiple coordinated tests of Intelligent Vehicle Systems with **ordinary drivers in real traffic**
- Investigate performance, driver behaviour and user acceptance
- Assess the impacts on safety, efficiency and the environment, based on road data
euroFOT Objectives (2)

- Consolidate a common European approach for FOTs
- Improve public awareness on the potentials of driver support functions
Functions under test

• Longitudinal control functions
  - Forward Collision Warning (FCW)
  - Adaptive Cruise Control (ACC)
  - Speed Restriction System (SRS)

• Lateral control functions
  - Blind Spot Information System (BLIS)
  - Lane Departure Warning (LDW)
  - Impairment Warning (IW)

• Advanced applications
  - Curve Speed Warning (CSW)
  - Fuel Efficiency Advisor (FEA)
  - Safe Human Machine Interaction (SafeHMI)
Exposures in different FOTs

Within euroFOT:
- 180 trucks
- 810 cars
- ~18.5 Mil. km

- Freightliner 2001
- Mach 2005
- Australia 2005
- Assisted driver NL_2006
- ACAS 2004
- ICC 1997
- Isa_UK 2007
- RDCW – 2005
- 100 car 2004

Volvo trucks

euroFOT

euroFOT - trucks only
	no trucks

cars
.... and the euroFOT approach

- Well developed ADAS and sensors on vehicles
- Reliable Data Acquisition systems based on partners’ experience
- Harmonised research questions / hypotheses for all fleets
- Common definition of scenarios and performance indicators: specific approaches when necessary
- Framework of guidelines for the operation of the different Vehicle Management Centres
Project plan

1. Specification & piloting
   - Preparation of fleets
     - selection criteria:
       - fleet / private
       - age
       - gender
       - profession
     - ACC
     - BLIS
     - FCW
     - IW
     - LDW
     - SafeHMI
     - CSW
     - SRS
     - FEA

2. Execution of FOT
   - customer is driving everyday routes
   - Datalogger will be installed in vehicle
   - data specification:
     - CAN, Video and other sensors, time resolution, format, GPS or matched streets
   - data collection:
     - On-the-fly transmission (GPRS & UMTS)
     - Data Pick Up

3. Impact assessment
   - Data analysis, evaluation and report
   - Socio-economic CBA
Highlights for on-going activities
Research Questions & Hypotheses (example)

• A research question is general, and has a question mark: 
  Does FCW decrease incidents?

• Hypotheses are either true or false 
  FCW reduces occurrence of decelerations above 5 m/s²

• Hypotheses can only be tested by means of reasonable indicators

• Hypotheses are statistically testable

• euroFOT examined >100 hypotheses for FCW/ACC 
  (only top-hypotheses selected)
Events and situation variables

For euroFOT:

- 25 events selected / 27 situation variables
- 81 performance indicators
- About 110 corresponding measures

Scenario: overtaking in day light in low traffic on rural road …

Events

- overtaking manoeuvre

Situation variables:

- weather (e.g. rain)
- traffic (e.g. low volume)
- lighting (e.g. day light)
- road type (e.g. rural road)
- vehicle occupancy (e.g. 1 passenger)
Data Acquisition Systems

Some specific issues:

- Low energy consumption in sleep mode
- Transmit data before entering sleep mode
- Fully OEM-tested and compatible
- Protection of proprietary data
- Encryption of data
- Driver annotation interface
- Possibility of audio recording
- Synchronisation with GPS
Data chain
Design of experiment

Drivers
• Represent as much as possible the population of buyers
• Professional drivers in the case of trucks
• Performance compared with and without the system (Baseline)
• Control group introduced for several functions

Vehicles
• According to the present EU market, technical feasibility
• Middle+top class cars, heavy trucks

Environment
• Specific events defined (e.g: overtaking manoeuvre)
• Situation variables specified (e.g: weather, visibility, driver status)
• Performance indicators are the basis for the overall evaluation (e.g: mean speed, mean time headway, frequency of braking,…)
Vehicle Management Centres (VMC)

French VMC
- 40 cars
- 12 months
- CAN + Video + Radar

German VMC
- Operation Center 1: 140 cars – 100 trucks
  - 12 months
  - CAN Only
- Operation Center 2: 90-105 cars
  - 12 months (4 x 3 months)
  - CAN + Video + eyeTracking

Italian VMC
- 300 cars
- 12 months
- Questionnaires only

Swedish VMC
- 100 cars – 50 trucks
- 12-18 months
- CAN + Video + extra Sensors
Selected lessons learned / Conclusions

- Use specific hypotheses; Prioritize hypotheses; Consider also combinations of functions
- Keep it simple
- Include baseline conditions in the FOT
- Define a sound data analysis plan, focused on quality (events, metrics)
- Define how to deal with safety impact analysis (crashes will be a rare, hopefully absent event)
- Anticipate the management of operational aspects (e.g: subject drop-outs, maintenance, assistance to drivers…)
- Plan long pilot tests and check technical / organisational issues
- Acquisition phase is long-winded, difficult and full of real world
- Consider data sharing issues and privacy discussions
The Consortium
Thanks for your attention

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