French Institute
of Science and Technology
for Transport, Development
and Networks

From FOT to NDS
Recent developments in UDRIVE

The first large-scale European Naturalistic Driving Study

Guillaume SAINT PIERRE

IFSTTAR

From FOT …

- Generally focus on evaluation of systems or functions
- UE funded several FOT among which
  - SeMiFOT (Sweden-Michigan Field Operational Test)
  - euroFOT (8 systems tested)
  - Many other smaller projects

- 1000 vehicles
- 9 car manufacturer
- 8 functions
- 1 year observation

- Adaptive Cruise Control
- Forward Collision Warning
- Speed Control System
- Blind Spot Information System
- Lane departure warning / Lane assist / Impairment warning
- Curve Speed Warning
- Fuel Efficiency Adviser
- Safe Human/Machine Interface

To NDS …

- Gain experience from FOT & methodology projects.
  - Lessons applied to UDRIVE
- Naturalistic Driving Studies tend to focus on crash-explanatory factors
- Data collected in both types of studies can be used for many alternative purposes, such as analysis of Environment, Efficiency and Mobility impacts.

UDRIVE

European Naturalistic Driving Study

5 thematics

- Crash causation and risk
- Normal driving/everyday driving
- Distraction and inattention
- Vulnerable road users
- Driving style and eco-driving

Facts

Project name	“European naturalistic Driving and Riding for Infrastructure & Vehicle safety and Environment”
Project type:	Collaborative project – Large-scale integrating project
Program:	7th EU Framework Programme
Project Coordinator:	Rob Eenink, SWOV
Consortium:	19 project partners
Start date:	1 October 2012
End date:	30 September 2016
Budget:	€ 10.617 mio.
EU funding:	€ 8 mio.

Europe-Wide Operations

Data collection will take place in seven EU Member States.

The choice of operation sites was motivated by aiming at having a good spread over countries with different characteristics in terms of road safety records, road user behaviour, road infrastructure, the presence of vulnerable road users, climate, traffic density, etc.

United Kingdom

Characteristics:

Operations in two distinct UK regions representing large and small urban areas and rural areas; relatively high congestion

France

Characteristics:

Mixture of urban roads, rural roads and highways; varied traffic conditions

Spain

Characteristics:

Middle-sized city traffic, many interactions between different types of road users; extra-urban ring-road with intersections low traffic density

Germany

Characteristics:

Middle-sized city; mixture of urban roads and highway traffic

Poland

Characteristics:

City traffic as well as sub-urban and rural traffic; road infrastructure under-developed with many construction sites

The Netherlands

Characteristics:

European-wide short and long haul truck driver observation, both highway usage and local distribution

Austria

Characteristics:

City traffic, good road infrastructure, with extensive urban highway network

The Data Acquisition System (DAS)

UDRIVE
European Naturalistic Driving Study

8 cameras:

Forward cameras

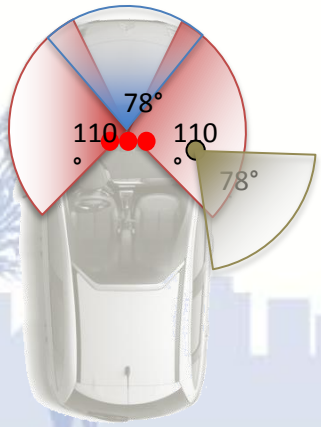
Feet camera

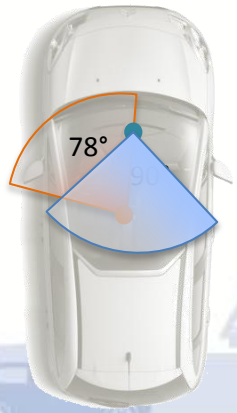
Face camera

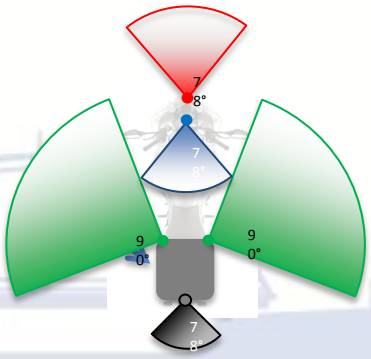
Driver's action camera

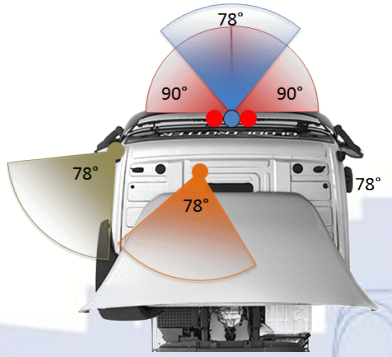
Passenger compartment camera

Right blind spot camera*









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Lens 6 mm
Lens 2,45 mm
Lens 2,45 mm
caméra C3
Lens 2,45 mm
camera C1

Fleet / Data collection

Type of vehicle	Country	Fleet size (number of DAS)	Number of participants
Car	France	30	50
	Germany	30	50
	Poland	30	50
	UK	30	50
Powered Two-wheelers	Austria	15	15
	Spain	25	25
Truck	Netherlands	50	50
			290

- DAS is technically validated, currently being piloted
- Data collection start this autumn

Some issues for a large NDS
Issue 1: Data processing

- Still a challenge to deal with massive heterogeneous data
- Preprocessing & enrichment & harmonization
  - to be made by experienced teams
- Video manual annotation still needed

- UDRIVE:
  - Centralized database
  - Harmonized pretreatment
  - 4 video annotation and analysis sites

Issue 2: Statistical data analysis

- New skills needed To fully utilize information contained in data
- Harmonization of definitions across europe
  - Events, triggers, surrogate measures

- UDRIVE:
  - New analyses methods
  - Common software toolset developed
  - Allow for cross-country comparisons
  - Investigates:
    - Environmental friendly behavior
    - Vulnerable road users

Issue 3: road risk vs safety related events

- The relation between SREs and real accidents is not yet very clear and validated.
- How to search for safety-related and surrogate events in a large NDS dataset?
- Which safety-related events should we consider to be surrogates?

- UDRIVE
  - Harmonization & data sharing
  - Common SRE definitions
  - Manual video coding
  - 21 months / data logger (210)

Issue 4: Using data

- Recent ND studies on safety
  - focus on some very small episodes, i.e. on safety-critical events.
  - searching for a needle in a haystack
- Much more to be learned from ND data

- Examples of RQ from UDRIVE :
  - Who engages in risky behaviour?
  - What driver characteristics influence speed choice?
  - Are environmental factors influential on driver behaviour?

Issue 5: re-using data

- Car and equipment manufacturers
  - How drivers interact with systems
  - Identify gaps in the driving assistances
- NDS may provide the behavioral baseline of “normal driving”
  - Development of ADAS
- Road maintenance can benefit from knowledge
  - Braking behavior of heavy vehicles
  - Fuel efficient roads characteristics.
- Fleet owners may be interested in distraction and fatigue.

- UDRIVE :
  - Common corpus of data available for further studies
  - Inspire & share definitions across NDS studies

Summary

- UDRIVE takes into account previous experiences
  - Data sharing
  - Common definitions & methodology
  - Common software
  - Comparisons across countries
  - Exploitation of all the data, not only for safety issues
- Data collection start soon !

Thank you for your attention

With the help of:

Oliver Carsten, Nicole van Nes, Jonas Bargman

Guillaume SAINT PIERRE

Guillaume.saintpierre@ifsttar.fr

http://perso.lcpc.fr/guillaume.saint-pierre/

Researcher at the Vehicle-Infrastructure-Driver Interactions Research Unit

French Institute of Science and Technology for Transport, Development and Networks

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