Implementation of Automated Driving Functions and Pre-Piloting

EUCAR Conference
7th November 2018, Brussels

Yves Page, RENAULT
What is a Pilot?
A Pilot is...

Source: Bryan Reimer, MIT – Tedx Waltham Event, June 2018
How do we run a Pilot?
The General Approach: the FESTA V Methodology
How did we translate it into the L3Pilot Project?
1,000 drivers 100 cars 10 European countries Piloting Automated Driving on European Roads.

Methodology

Data

Evaluation

Fleet

Piloting

Code of Practice

PREPARE

DRIVE

EVALUATE

DEPLOY - Europe-wide Piloting Environment - User Studies - Business Studies

Traffic Jam

Motorway

Parking

Urban
1,000 drivers 100 cars 10 European countries Piloting Automated Driving on European Roads.

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PREPARE

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DEPLOY - Europe-wide Piloting Environment - User Studies - Business Studies

Traffic Jam

Motorway

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Urban
Objectives of the Preparation Phase

“Everything is ready for Pilot”
What does “Everything” mean?
“Everything”

• The AD functions to be evaluated in L3 Pilot are described in sufficient details

• The AD functions are adapted and implemented in the test cars

• The vehicles and their AD functions are pre-tested

• Legal issues (compliance to laws and regulations, including data privacy and insurance) and cyber protection are considered
“Everything”

- The AD functions to be evaluated in L3 Pilot are described in sufficient details.
- The AD functions are adapted and implemented in the test cars.
- The vehicles and their AD functions are pre-tested.
- Legal issues (compliance to laws and regulations, including data privacy and insurance) and cyber protection are considered.
4 macro Use Cases for Passenger Cars

Traffic Jam  Motorway  Parking  Urban

1,000 drivers 100 cars 10 European countries Piloting Automated Driving on European Roads.
AD Functions are described in sufficient details

Table 3.1: L3Pilot functions by SAE automated driving level.

<table>
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<tr>
<th>ID</th>
<th>Parking</th>
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<td>Level 3</td>
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</table>
Cars of the Pilot Fleets are identified

- Audi: Probably A8
- BMW: 7 Serie–5 serie (Parking), 7 Serie–5 serie (Highway)
- FCA: Maserati Ghibli: (Highway), Jeep Renegade: (LVM)
- Legend
- Ford: Fusion
- Jaguar: Discovery MK5
- Land Rover: C4 Picasso D7
- PSA: eGolf
- Toyota: Pacifica
- Lexus
Most of the “Study design” is fixed

Professional (Company) Drivers

Ordinary drivers **under** supervision

Ordinary drivers **without** supervision

- Audi
- FCA
- PSA
- Toyota
- BMW
- Honda
- Jaguar
- Renault
- Nissan

L2/L3

L4
“Everything”

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Preparation of Fleet – The long and winding road…

- **Vehicle Technically Ready**
  - July 18
  - ADF Adapted to the Vehicle: August 18

- **ADF tested and approved**
  - Sept 18

- **Video and/or eye tracking installed**
  - Sept 18

- **Tests subjects selection**
  - Sept 18

- **Signals in common data format**
  - Sept 18

- **Logger installed and tested**
  - Sept 18

- **Vehicle Approved for public roads**
  - Sept 18

- **Database ready**
  - Oct 18

- **Signals in common data format**
  - Nov 18

- **First test trips performed**
  - Jan 19

- **Simple analysis performed**
  - Feb 19

- **Ready for Ramp-Up**
Preparation of Fleet – The long and winding road...

- Vehicle Technically Ready
- ADF tested and approved
- ADF Adapted to the Vehicle
- Around view camera
- Lidar
- Front tri-cam
- Corner radars
- Around view camera
- Long range radar
- Autonomous Drive by Renault
Preparation of Fleet – The long and winding road...

- **July 18**: Vehicle Technically Ready
- **August 18**: ADF Adapted to the Vehicle
- **Sept 18**: ADF tested and approved
- **Sept 18**: Logger installed and tested
- **Sept 18**: Vehicle Approved for public roads
- **Sept 18**: Tests subjects selection
- **Sept 18**: Signals in common data format
- **Sept 18**: Video and/or eye tracking installed
- **Sept 18**: Database ready
- **Oct 18**: First test trips performed
- **Nov 18**: Signals in common data format
- **Jan 19**: Simple analysis performed
- **Feb 19**: Ready for Ramp-Up

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Preparation of Fleet – The long and winding road…

Video and/or eye tracking installed

Logger installed and tested
Preparation of Fleet – The long and winding road…

- **Vehicle Technically Ready**
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  - Tests subjects selection: Sept 18
  - Signals in common data format: Oct 18
  - Simple analysis performed: Nov 18
- **Ready for Ramp-Up**
  - Database ready: Sept 18
  - First test trips performed: Nov 18
  - Vehicle Approved for public roads: Sept 18
  - Logger installed and tested: Sept 18
  - Simple analysis performed: Oct 18

Notes:
- First test trips performed: Nov 18
- Ready for Ramp-Up: Feb 19

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Preparation of Fleet – The long and winding road…
Preparation of Fleet – The long and winding road…

- **Vehicle Technically Ready**
- **ADF tested and approved**
- **Video and/or eye tracking installed**
- **Tests subjects selection**
- **Signals in common data format**
- **Simple analysis performed**
- **ADF Adapted to the Vehicle**
- **Logger installed and tested**
- **Vehicle Approved for public roads**
- **Database ready**
- **First test trips performed**
- **Ready for Ramp-Up**

- **July 18**
- **August 18**
- **Aug 18**
- **Sept 18**
- **Sept 18**
- **Sept 18**
- **Sept 18**
- **Oct 18**
- **Nov 18**
- **Jan 19**
- **Feb 19**
Preparation of Fleet – The long and winding road…

Tests subjects selection

Professional (Company) Drivers
Ordinary drivers **under** supervision
Ordinary drivers **without** supervision
Preparation of Fleet – The long and winding road…

[Diagram showing milestones and timelines for fleet preparation, including:
- Vehicle Technically Ready
- ADF tested and approved
- Video and/or eye tracking installed
- Tests subjects selection
- Signals in common data format
- Simple analysis performed
- ADF Adapted to the Vehicle
- Logger installed and tested
- Vehicle Approved for public roads
- Database ready
- First test trips performed
- Ready for Ramp-Up]

Milestones:
- Vehicle Technically Ready: July 18
- ADF tested and approved: August 18
- Video and/or eye tracking installed: Sept 18
- Tests subjects selection: Sept 18
- Signals in common data format: Sept 18
- Simple analysis performed: Oct 18
- ADF Adapted to the Vehicle: Aug 18
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- Database ready: Sept 18
- First test trips performed: Nov 18
- Ready for Ramp-Up: Feb 19
Preparation of Fleet – The long and winding road…

Signals in common data format

Database ready
Preparation of Fleet – The long and winding road…

- **Vehicle Technically Ready**
- **ADF tested and approved**
- **Video and/or eye tracking installed**
- **Tests subjects selection**
- **Signals in common data format**
- **Simple analysis performed**

**July 18**
- ADF Adapted to the Vehicle
- Logger installed and tested
- Vehicle Approved for public roads
- Database ready
- First test trips performed
- Ready for Ramp-Up

**August 18**
- ADF tested and approved

**Sept 18**
- Video and/or eye tracking installed
- Tests subjects selection
- Signals in common data format
- First test trips performed

**Oct 18**
- Signals in common data format

**Nov 18**
- First test trips performed

**Jan 19**
- Ready for Ramp-Up

**Feb 19**
- First test trips performed

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Preparation of Fleet – The long and winding road…

- Vehicle Technically Ready
- ADF tested and approved
- Video and/or eye tracking installed
- Tests subjects selection
- Signals in common data format
- Simple analysis performed
- ADF Adapted to the Vehicle
- Logger installed and tested
- Vehicle Approved for public roads
- Database ready
- First test trips performed
- Ready for Ramp-Up

- July 18
- Aug 18
- Sept 18
- Sept 18
- Sept 18
- Oct 18
- Nov 18
- Jan 19
- Feb 19
Summary SP status: Preparation of Fleet – Real-World

Vehicle Technically Ready
ADF tested and approved
Video and/or eye tracking installed
Tests subjects selection
Signals in common data format
Simple analysis performed

ADF Adapted to the Vehicle
Logger installed and tested
Vehicle Approved for public roads
Database ready
First test trips performed

Partially Ready for Ramp-Up

July 18
Feb 19

All milestones will be delayed but M18 Milestone can be held by most vehicle owners for at least one vehicle.

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“Everything”

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• The vehicles and their AD functions are **pre-tested**

• **Legal issues** (compliance to laws and regulations, including data privacy and insurance) and **cyber protection** are considered
Conclusion
What are the Challenges?
What are the Challenges?

- **Technical Challenges**
  - Technical readiness and safety of prototypes
  - Test the whole chain of acquisition of data

- **Methodological Challenges**
  - Test the questionnaires for User Acceptance Analysis
What are the Challenges?

- Compliance Challenges
  - Regulation for AD experiments
  - Cyber Protection Standards
  - GDPR

- Time Challenges
  - Be ready for March 2019 with at least one car
Let’s roll.
Optimistically that the fruits will hold the promises of the flowers
Thank you for your kind attention.

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### L3Pilot Partners

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<th>OEMs</th>
<th>Suppliers</th>
<th>SMEs</th>
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