Evolution Zone

- **Institut Pascal**

Autonomous Driving of Shuttles with Several Modalities and in Challenging Conditions.

6 demonstrations:

1) Realtime Visual Slam for precise localization and control of a shuttle
2) Bi-steering control law
3) Radar Slam
4) Object detection with an embedded Deep Convolutional Neural Network
5) Flexible and Safe Navigation in Formation based on Target tracking/reaching and Reliable Risk Management procedure
6) UWB based relative localization for mobile robot following

- **UTC**

Autonomous roundabout crossing

1) Cooperative communicating vehicles
2) Interaction with manually driven vehicles

Urban Track – Eastern Loop

- **IAV**

Object Classification and high precision Localization based on CNNs and Data Fusion

IAV team will show their advances in intelligent vehicle data fusion and enhanced perception, based on lidar and computer vision for environment understanding, mapping and localization.

The demo vehicle is equipped with a spinning lidar sensor and a camera sensor. The sensor data is synchronously acquired using a real-time data system. They utilize the synchronized data to localize and classify environmental objects with high precision using deep learning techniques based on CNNs. Therefore, the advantages of each sensor type is exploited by intelligent data fusion. Through this setup, they are able to perform an effective test and validation of vehicle functions. Furthermore, this system is used to automatically annotate video sequences.

On the other hand, the team will show their algorithms for obstacle detection and classification using fisheye cameras, their approach for pedestrian intention detection using fisheye cameras, and lidar pointcloud conversion to occupancy grid maps with ego-motion compensation, among others.

- **KIT**

Perception and Planning in Presence of Vulnerable Road Users

1) Passing Vulnerable Road Users
2) Reacting to Pedestrians at Crosswalks
3) Interaction with Other Vehicles

Urban Track – Northern Part

- **Sanef**

Tolling system using the ITS-G5 technology

Presentation of the performance of the vehicle at the approach to the toll plaza and the toll point.

- **TU Delft**

Interaction of Self-Driving Vehicle with Pedestrian.

A scenario of a pedestrian entering laterally the path of a self-driving vehicle (SDV). Using a sophisticated pedestrian dummy with articulated limb motion from 4activeSystems.

- **PSA**

ADAS functions currently marketed (ACC, LCA, AEB)

1) Dynamic test on the main track (ACC+LCA) : a target followed and the tested car behind

2) Dynamic test near the vedecom hangar (AEB) : with a static target

Urban Track – Western Loop

- **INRIA – Grenoble**

The CMCDOT framework, and its applications, for autonomous car data fusion, perception and navigation.

Display the embedded capacities of a modified electric Renault Zoe car, which has been equipped with lidars, cameras, IMU, and an added programming module, making it able to be autonomously driven, manually driven with advanced driving assistance functionalities, or simply manually driven (as if unmodified)

- **Centre for Automation and Robotics (UPM-CSIC) (Spain)**

Navigation and decision-making for medium and high speeds

Presentation of the navigation architecture of AUTOPIA, ranging dynamic global planning to local motion planning.The vehicle will dynamically generate a human and efficient path and speed profile.

High Speed Track

- **Automate project**

The European project AutoMate aims at enhancing safety by using the strength of both the automation and human driver in a dynamic situation dependent way. The automation is understood and designed as the driver's companion or TeamMate. This means that driver and automation are regarded as members of one team that understand and support each other in pursuing cooperatively the goal of driving safely, efficiently and comfortably from A to B. In such a context, the project foresees three demonstrators, acting in three different scenarios.

The one that will show CRF team members during the exhibition is called Eva and it deals with approaching a roundabout in different driver's and system states. The EVA scenario is relevant because it highlights the limits of the automation that can be overcome with the support of the driver (for the Human-To-Automation – H2A in short – support). This kind of cooperation can be both in perception and in action modes. The evaluation of the scenario will highlight the value of the driver to overcome these limits.

VEDECOM will demonstrate several capabilities of the TeamMate car drived automatically or manually and the cooperation between the driver and the automation.

The Scenario:

Martha is driving the TeamMate car in manual mode when encountering a slower vehicle. The intention recognition function learnt that Martha is willing to overtake. The online risk assessment evaluates the maneuver and communicates with Martha through the Augmented Reality HMI and informs her when it is safe to overtake. Afterwards, Martha looks for information on her iPad, therefore the DMS detects that she is distracted and the automated mode is suggested. Martha activates the automated mode and can engage in non-driving related tasks. Thanks to V2I communication, TeamMate detects in advance an upcoming roadwork zone and asks Martha to overtake manually. The early takeover request allows a comfortable manual takeover and a safe avoidance of the roadwork zone.

Key words: Traffic prediction, vehicle state prediction, perception path planning, HMI, Augmented realtity HMI. Risk assesment, situation enrichment

Forest Track

- **VALEO**

Valeo Drive4U® Urban Pilot

3 demonstrations:

1) Surrounding traffic : using one vehicle as surround vehicle (will cut in, cut out, overtake, stop in lane), and another for intersection (junction with the big ans small track)
2) Traffic light using vehicle onboard sensors perception
3) Stops & Pedestrian crossings using Map data and accurate localisation

- **Ecole Centrale NANTES**

Autonomous navigation and parking maneuvers with a Renault ZOE

A car will un-park and navigate in autonomus mode along a pre-recorded trip on the "forest circuits" and will park autonomously at the end of the trip.