2012 IEEE Intelligent Vehicles Symposium – Demonstrations

7 June, 2012
Instituto Nacional de Técnica Aeroespacial (INTA)
Torrejón de Ardoz
http://www.robesafe.es/iv2012

Title:	High speed CACC with lateral control
Company / Contact:	AUTOPÍA Program Centro de Automática y Robótica (UPM-CSC)
Description of your project	The goal of this demonstration is to show that fully cooperative automated vehicles can be used in highways. To that end, a leading vehicle will be manually driven at high speeds (~80 km/h) and its position will be communicated to the trailing automated car, which will adapt its speed to a preset time gap and will act on the steering wheel to track a dynamic map generated by the leading vehicle positions.
Description of your vehicle/ mock up	Citroën C3/ Citroën C3 Pluriel 
Description of the test drive	The demonstration will be performed in the INTA high speed ring to emulate highway geometry and driving conditions.


Starting point
Ending point

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Title:	Autonomous Vehicle Navigation and Obstacle Avoidance using GPS and Lidar.
Company / Contact:	University of Alcala & CSIC Miguel Ángel Sotelo miguel.sotelo@uah.es David Fernández Llorca llorca@aut.uah.es Carlos Fernández López carlos.fernandezl@uah.es
Description of your project	This test drive is part of a project we are developing at University of Alcala and CSIC. The project goal is to drive autonomously in urban environments using computer vision, gps and lidar sensors. Urban scenarios are complex and drive with real traffic is even more difficult, so for this demonstration, a simplified scenario is proposed.
Description of your vehicle/ mock up	The vehicle we are going to use in this demonstration is an electric mini-bus. The vehicle is driven by wire and the sensors installed on it are GPS localization unit and Velodyne 32 lidar. The lidar sensor is installed in the front of the vehicle in order to detect obstacles during the demonstration.
Description of the test drive	The vehicle is going to drive autonomously in a circuit at INTA avoiding obstacles and stopping if the obstacle does not allow to drive. Navigation is based on GPS waypoints and obstacle detection is based on lidar sensor. The obstacles we are going to use in the test drive are a human-driven vehicle and


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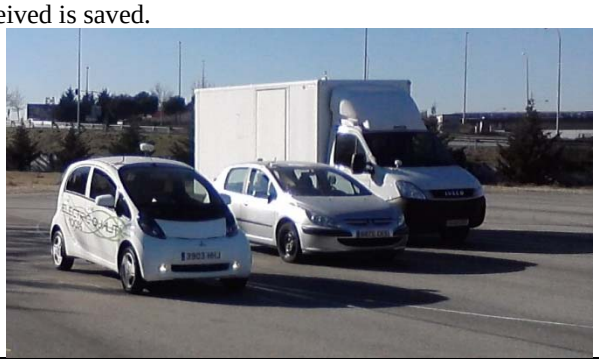
Title:	V2V communications using Wireless Sensor Networks as nodes of the VANET
Company / Contact:	University Institute for Automobile Research (Technical University of Madrid) Dr. José Eugenio Naranjo INSIA – UPM. Carretera de Valencia km 7, 28031 Madrid E-mail: joseeugenio.naranjo@upm.es
Description of your project	V2V communications using Wireless Sensor Networks (WSN) as nodes of the VANET and three vehicles that circulate on public highways in free flow traffic situations. These results show that this communications technology is able to support continuous mesh data transmission with enough features of efficiency and reliability to be used as main data source in a big set of advanced driver assistance systems (ADAS)
Description of your vehicle/ mock up	A set of vehicles are equipped with communications devices and GPS receivers. The MTM-CM3100 is configured to act as mesh network gateway and connected to a laptop, where all the information received is saved. 
Description of the test drive	Demonstrations of the communications between different vehicles and the reconfiguration of the nodes of the mesh while driving. Vehicles are considered VANET nodes, linked in a reconfigurable mesh, that share navigation information periodically that will be used for ADAS applications. This information could be transmitted to the infrastructure

	layer in order to be used in any kind of road safety application. Three wireless mesh connected vehicles will circulate through the INTA's high speed track behaving as normal highway situations. The representation of the wireless mesh configuration will be shown in a screen in the Demos public area.

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Title:	DRIVE C2X / SISCOGA
Company / Contact:	CTAG
Description of your project	
Description of your vehicle/ mock up	It will be a passenger vehicle with integrated communication system for C2X applications. The only modifications over a normal vehicle will be: • Integrated antenna for C2X communication • Integrated prototype control unit for C2X applications • Integrated HMI
Description of the test drive	The test drive will consist on the following activities: • The vehicle will drive along an specific corridor where some roadworks are simulated. The C2X system will receive advanced information about these roadworks and they will be displayed on the HMI This makes necessary to integrate a second communication unit outside the vehicle in the test track. Therefore, power input will be required in the place.

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Title:	IvvI: Intelligent Vehicle based on Visual Information
Company / Contact:	Universidad Carlos III de Madrid / José María Armingol (armingol@ing.uc3m.es)
Description of your project	IVVI is an experimentation platform for researching and developing Advance Driver Assistant Systems based on Computer Vision and Laser Techniques for: • Road Sign Recognition • Visible and Infrared Pedestrian Detection • Driver Monitoring System • Lane Departure Warning
Description of your vehicle/ mock up	The experimental platform is a Nissan Note:  The sensorial system consists of: • Stereo vision system for lane and obstacle detection. • A color camera for traffic sign recognition. • An infrared camera for night perception. • A pin-hole camera for the inside-vehicle perception. A laser for pedestrian and obstacle detection. •A GPS for speed and location data acquisition
Description of the test drive	Different tests will be performed in order to show the described ADAS.

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Title:	SACAT: An Instrumented Vehicle for Driver Assistance and Safety
Company / Contact:	Universidad Europea de Madrid javier.fernandez@uem.es; nourdine.aliane@uem.es
Description of your project	SACAT is an instrumented vehicle for driver assistance and sSafety which combines several functionalities: namely driver assistance system based on traffic signs recognition able to operate during day and nighttime, a system for traffic violation recording used for monitoring driving, and a realization of an emergency call system in case of accidents.
Description of your vehicle/ mock up	The experimental platform is based on a Nissan Note car model. Its embedded hardware consists of a Mini-ITX board as a host computer, and a PC as slave computer for real-time image processing. Both of them placed in a single rack located in the vehicle's boot. The Mini-ITX board integrates various readily available chipsets, such as flash memory card adapter, a slot for connecting smart cards reader, a Bluetooth device for connecting to mobile phones, and a multiple of external devices necessary for driving assistance like a GPS unit, a CAN interface and a touchpad screen. All the electronic devices are powered by a dc/ac inverter, transforming 12V from the vehicle battery to 600W of 220V AC.    
Description of the test drive	The test drive will present 3 demonstration: 1. A system for traffic violation recording. 2. An emergency call system.

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Title:	Vehicle to Home demonstration
Company / Contact:	Endesa : Narcís Vidal narcis.vidal@endesa.es Endesa is one of the largest electric power companies in the world and Spain's largest utility, as well as the leading private multinational enterprise in Latin America. Including Spain, we have operations in a total of 10 countries, in Latin America, Europe and Africa. At Endesa, we look to the future, seeking intelligent solutions, to develop realistic proposals that address present and future energy challenges. Endesa has an important position in other sectors, such as gas, and is one of the main gas suppliers in Spain. Over the last decade, Endesa has established a clear commitment to this energy source, in order to offer an integrated and complete service to our customers. Endesa, with operations in ten countries, provides services to over 25 million customers. Our Blue Attitude means being committed to people, listening to our customers in order to establish a dialogue with them, and ensuring that their interests remain our top priority. It means being committed to economic and social development in the countries where we do business. And all of this is possible thanks to the work of 25,000 professionals all over the world.
Description of your project	The V2M project deals with intelligent systems for the integration of electrical vehicles into power systems with distributed generation. This project has received funding from the Endesa NOVARE 2009 R+D+i international awards. Endesa funds this R+D+i project that is led by CITCEA-UPC and counts with the collaboration of IREC The main objective is the deployment of V2G on smart grids. In order to get such objective, opportunities and challenges for the deployment of V2G are analyzed, and V2G systems for using EV as storage are developed. Moreover, smart

	management strategies of EV with V2G capability in distribution power systems with distributed generation are proposed and these will be validated in a microgrid with fast-charge and micro-generation.
Description of your vehicle/ mock up	Vehicle to Home (V2H) system permits the use of the energy stored in the battery of the EV for feeding the loads if there is no supply from public network. Thus, it can improve the power quality of homes by reducing the time of interruptions especially in rural areas. The V2H system consists of an off-board power electronics converter connected to the DC plug of the EV.
Description of the test drive	It will be shown an EV with V2H capability.