Variations on a theme

Felipe Jiménez, **José Manuel Menéndez** and **José F. Papí**
herald the Launch of the Spanish Thematic Network on Intelligent Vehicles (RETEVI)

Intelligent transportation systems, intelligent vehicles and their implications on infrastructure and users are gaining an increasing importance as they offer a growing potential in line with the improvement in the technologies that enable them.

In this regard, the market growth of vehicle semi-automation and connectivity applications is considerable. Also noteworthy is the large amount of news related to prototypes and research carried out by vehicle manufacturers, component manufacturers and other players entering the sector.

The autonomous vehicle not only brings a technological leap, but also a social leap in automotive design and mobility, with implications for public transport and freight transport over short and long trips. Despite the progress made in recent years, many research areas remain open if we are to achieve the highest levels of automation, levels 4 and 5, such as an analysis of the interaction with the driver and the interaction with other users, a reliable recognition

▲ **The future evolution of cooperative services should facilitate the synergy between vehicles and infrastructures**

of the environment by reliable sensors at an affordable cost, legal and ethical issues, a more natural integration into unstructured environments, etc.

C-ITS cooperative systems can be rightfully considered as catalysts in the current boom connected to the development and deployment of autonomous vehicles. In addition, C-ITS should not be regarded as independent, unconnected actions, as they add perception and decision elements supported by communications leading us to cooperative autonomous driving.

In this scenario, the C-ITS European Platform has recently approved the deployment of a first set of cooperative systems, called Day-1, which will use V2V and V2I communications. During 2017, it is expected that this initial set will be expanded to Day-1.5 C-ITS, so 20 per cent of all vehicles include these capabilities by 2020. Therefore, we should anticipate a 'shared' traffic situation that will involve both vehicles equipped with cooperative capacities fitted with autonomous or semiautonomous functions and other purely manually driven vehicles that will remain the large majority for a long period of time.

Beyond the traditional research areas in the field of automobile and road transport in general, other scientific and technological areas are becoming very relevant due to their direct or indirect applicability to the new scenario described above. In this sense, an interdisciplinary approach is becoming more common and synergies should be pursued.

GROUP DYNAMICS

With the above in mind, a Thematic Network on Intelligent Vehicles (RETEVI) has been launched with the support of the Spanish Ministry of Economy and Competitiveness. This national network, led by the University Institute for Automobile Research (INSIA) of the Technical University of Madrid (UPM), regroups a large set of research groups active in transport systems and intelligent vehicles: Carlos III University of Madrid, University of Alcalá, Spanish National Research Council (CSIC), Technical University of Cartagena, Computer Vision Center & Autonomous University of Barcelona, TECNALIA Research & Innovation Foundation, Ceit-IK4 Technology Center, Galician Centre for Automotive Technology (CTAG), University of La Laguna, University of Las Palmas de Gran Canaria, University Rey Juan Carlos, Complutense University of Madrid, European University of Madrid, and other UPM groups.

▲ **Financed by the Ministry of Economy and Competitiveness, RETEVI is led by the University Institute for Automobile Research (INSIA) of the Polytechnic University of Madrid (UPM)**

This plurality of partners allows taking into consideration the main methodologies and technological tools relevant to ITS research (such as autonomous vehicles, inter-vehicle communications, cooperative services and vehicle sensing) in the workings of the Thematic Network. The Network mission is to create a framework for joint action, to promote the organisation of technical and informative events, to write scientific papers, and to coordinate a shared participation in national or international forums.

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One of the main objectives of the Network is to promote research and innovation not only in vehicles, but also in infrastructures. It is evident that transport infrastructure managers have a very large volume of information in areas such as safety and traffic management. It is expected that the volume of road transport data that the infrastructure gathers will grow exponentially in the coming years as the Internet of things (different types of sensors of different types sending real-time data through communication networks) and the use of social networks become widespread among the population. The intelligent vehicle can and should draw on that possibility, and the future evolution of cooperative services should facilitate the synergy between vehicles and infrastructures.

To strengthen the link between vehicles and infrastructures, and therefore promote innovation synergies in both fields, the Technical University of Madrid has joined the Smart Transportation Alliance (STA), a non-for-profit collaborative platform whose mission is to lead actions improving methods, technologies and standards associated with transportation infrastructures. In this regard, the joint activity of the Spanish RETEVI Network and the STA platform follows very closely the guidelines set by the Final Report prepared by the Platform for the Deployment of Cooperative Intelligent Transport Systems in the European Union (C-ITS Platform), created by the European Commission (DG MOVE) in November 2014.

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More information about the Spanish RETEVI Network can be found at www.retevi.es.