The “DEWI” EU-project – 40 million Euros for a wireless future

TECHNOLOGY
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The ambitious DEWI project, which is lead by VIRTUAL VEHICLE, includes 58 European partners from industry and research coming from 11 different countries. The aim of the project is to strengthen Europe’s leading position in the field of Embedded Systems. DEWI (dependable embedded wireless infrastructure) focuses on the introduction and further development of wireless sensor networks and wireless communication in various industrial and user domains such as automotive, aviation, rail, and building. What sounded very much like sci-fi a couple of years ago, has to some extent already become reality and will be a constant part of our lives in the near future. Wireless systems embedded in buildings, machines, cars, trains, and planes are going to change and improve our daily lives. The DEWI project is part of the ARTEMIS EU-initiative and is being funded by the participating countries, as well as by the EU. The project, which was launched in late March, is now in full swing.

DEWI: Dependable Embedded Wireless Infrastructure

DEWI stands for “dependable embedded wireless infrastructure” and its basic idea is to create a reliable, intelligent, and connected environment to support the individual. There will be sensors, control units, screens, and computer based elements. All these elements are connected to each other and integrated into common objects used in our daily lives. Many current wireless solutions are not as advanced yet so that they could replace their wired equivalent on the market. Therefore DEWI focuses mainly on the needs of industry and users.

DEWI is far from being a fundamental research project, In more than 20 industry-driven use cases it shows innovative and definite applications in the fields of automotive, aviation, rail, building. For the coming 36 months about 150 researchers are going to develop wireless sensor networks and applications for the professional and civil user. The results will then be shown to the public in attractive real-life demonstrators all over Europe.

The heart of DEWI: The intelligent “bubble”

The central idea in DEWI is the so-called sensor & communications bubble. This bubble is defined by fast, simple, and spatially limited wireless access, secure wireless communication, as well as flexible self-organisation and adaptability. The bubble offers – depending on each situation – new, comfortable, and safe services.

The three major elements of such a “bubble” are:
1) The user
2) The DEWI bubble nodes (wirelessly connected communication and sensor nodes within the bubble)
3) The DEWI bubble gateways (gateways between the bubble and the outside world)

Application examples in DEWI

A modern car has about 70 to 80 electric control units. In case the software needs an update, currently a new software can only be transferred via a connector at the garage. Within DEWI strategies and solutions are being worked on so that a new update can also be transferred wirelessly outside of garages, while parking for example, without the risk of common problems with wireless transfers (bad reception, security issues) and without the need of the owner to interfere.

It would be helpful to find out automatically which types of trailers (engine, carriage, box wagon,…) are used when a train is put together, but this has been a rather complicated process up to now. With trailers equipped with independent wireless sensors – as opposed to wired solutions – it would be significantly easier. These sensors communicate with each other and automatically report in detail about the train’s physical data, such as overall length, number of axles, weight, and dynamic data, such as breaking behaviour and breaking data.

The telemetry system of the Ariane 5 rocket consists of about between 600 and 800 sensors including thousands of cables, which are needed to transfer relevant data and are allocated in the 40m long body of the rocket. 70% of all the weight of the avionics, in other words all electrical and electronic equipment on board the Ariane 5, are cables. Using wireless sensors instead for at least some of it, would help to drastically decrease weight. This would help to reduce fuel consumption or increase the cargo load. DEWI therefore also leads the way for wireless solutions into civil aviation.

Another example for wireless sensor networks can be found in the area of building security. Through DEWI various information from different data sources in a building complex is being collected, analysed, and summarised to be able to get an accurate overview in safety critical situations, such as chemical accidents and fire. In extremely critical situations, like a terrorist attack, measures such as face recognition methods and the use of drones are taken.

Benefits of DEWI wireless solutions in The main benefits of intelligent wireless systems are:

• Reduced weight, especially where any additional weight causes an increase in cost or effort
• High flexibility and configurability
• Elimination of errors caused by wrong wiring
• Higher reliability through reduced wear
• Higher operating reliability through efficient redundant solutions
• Low cost for instalment, and simple and inexpensive updates
• Open solutions for individual user demands („bring your own device” applications)
• Reduced costs by being able to reuse standardised modules

DEWI solutions offer more ways of individual control and design for the user. Their daily lives, at work or at home, will become less stressful, simpler, and more efficient. VIRTUAL VEHICLE

VIRTUAL VEHICLE is a leading research center in Graz, Austria, that develops affordable, safe and environmentally friendly vehicle concepts for road and rail. The key aspects of the research and development include connecting numeric simulation and experimental verification, as well as developing a comprehensive, full-vehicle system simulation.

About 200 experts from an international network of industrial and research partners devise innovative solutions and develop new methods and technologies for the vehicles of tomorrow. VIRTUAL VEHICLE is currently working in close collaboration with over 85 industrial partners (including Audi, AVL, BMW, Daimler, MAN, MAGNA, Porsche, Renault, Siemens and Volkswagen) and, in addition to our principle scientific partner, Graz University of Technology, more than 30 global university research institutes (including KTH Stockholm, KU Leuven, Universidad Politécnica de Valencia, St. Petersburg State Polytechnical University, TU Munich, KIT Karlsruhe, University of Sheffield, or CRIM Centre de Recherche Informatique de Montreal). In corporate year 2012, VIRTUAL VEHICLE generated a turnover of 20 million Euros.

The COMET K2 program will provide the basis for funded research activities until at least the end of 2017. VIRTUAL VEHICLE directs and participates in a wide range of future-oriented EU projects and also offers a broad portfolio of contract research and services.

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