



LOW Emissions with Hy-Nets

Car2x communication for
more efficient hybrid drives

Car2x communication is already a hot topic, especially when it comes to accident prevention. But cars that “cooperate” with each other and with the infrastructure could also improve propulsion.

Would it be possible to use the advancing digitalization of mobility to improve not only the safety of future vehicles but also their fuel consumption and emissions? This question led dSPACE, DENSO, RWTH Aachen University and the University of Paderborn to initiate their research project “Hy-Nets:

Efficient Hybrid Propulsion using Vehicular Communication”. In the fall of 2015, the project was a success at the “MobilitätLogistik. NRW” competition and therefore receives funds from the European Regional Development Fund (ERDF) for 30 months. The city of Paderborn and the engineering office Geiger &

Hamburgier (IGH) support the project as associated partners.

Analyzing Digital Mobility with a View to Efficiency

Hy-Nets aims at bundling several topics of vehicle technology that up to now have been observed separately, to open up entirely new effi-



“For the very first time, Hy-Nets makes it possible to measure the direct effects of future networked traffic scenarios on a real hybrid drive and evaluate the interaction with the environment with a view to energy consumption and vehicle flow.”

Ulrich Schwarz, Senior Manager EVIHV, DENSO

ciency potentials for the hybrid vehicles of tomorrow. In contrast to existing controls of hybrid drives, which are primarily based on vehicle-internal information, Hy-Nets for the first time also considers Car2x communication, i.e., the communication between vehicles and/or between vehicles and the infrastructure. It is this holistic approach considering all the different levels that brings entirely new efficiency maximization methods into researchers' focus. These methods include predictive energy management, new autonomous driving functions and, especially, the “cooperation” of communicating vehicles in cooperative traffic scenarios.

Connecting Real Propulsion Technology with Simulated Traffic Scenarios

To accurately analyze the interaction of the real hardware and software

of a hybrid drivetrain with such complex traffic scenarios, Hy-Nets is building a prototype of a state-of-the-art hybrid drive (DENSO) and will install it in one of the most advanced test facilities in Europe (RWTH Aachen University). On a test bench, the prototype will be connected to a powerful simulator that simulates the traffic environment of the hybrid vehicle (dSPACE), the general traffic flow, and the entire vehicle and infrastructure communication (University of Paderborn) with utmost precision. This makes it possible to operate the real hybrid drive in complex simulated driving scenarios that are based on real traffic data (city of Paderborn) and traffic light control data (IGH). The researchers of the Hy-Nets project hope to use the insights from the test bench to develop a more demand-appropriate design of future hybrid drives. This would mean that the digitaliza-



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tion of mobility could also open up entirely new and promising possibilities in an ecological context. ■

With the kind permission of the Hy-Nets project consortium.

Test facility in Aachen: For the Hy-Nets project, a real hybrid drive is connected to a hardware-in-the-loop simulator on a test bench. The simulator simulates the vehicle environment, the general traffic flow, and the entire vehicle and infrastructure communication. This creates virtual traffic scenarios that can be used to thoroughly test the hybrid components. This work is done partially at the Center for Mobile Propulsion, which is funded by the Deutsche Forschungsgemeinschaft (DFG), the largest independent research funding organization in Germany.

