

Highly integrated electric motor unifies powertrain components for an electric vehicle

April 11 2014, by Klaudia Kunze



The MotorBrain prototype: A highly compact electric motor without using rare earth metals.

German researchers present the prototype of an electric motor that may shape the future of electromobility: Small, light and efficient. The electric motor was created and constructed by the four German partners in the European research project "MotorBrain": Infineon Technologies, Siemens, the Institute of Lightweight Engineering and Polymer

Technology at the Technische Universität (Technical University) Dresden and ZF Friedrichshafen. The prototype is being presented at the Hannover Messe "MobiliTec" fair stand of the German federal government (Hall 27, Stand H51).

The MotorBrain prototype is a highly integrated [electric motor](#) that unifies the most important components of the powertrain for an electric vehicle. The researchers have succeeded in designing a highly compact electric motor with only three-quarters the size of models from 2011, the year when MotorBrain began. The electric motor prototype now being presented could easily fit in a conventional-sized laptop or notebook backpack. And on top of that, it's lighter than before. By the integration of motor, gear drive and inverter the MotorBrain partners were able to cut down the weight of the powertrain by approximately 15 percent, from 90 kilograms to less than 77 kilograms. Reduced size and weight will benefit the future car owner: A lighter electric vehicle that brings battery power "to the street" more efficiently and has a longer range than the [electric vehicles](#) of today. A medium-sized vehicle with MotorBrain electric motor and performance of 60 kilowatts (equal to about 80 hp) would be able to drive a good 30 to 40 kilometers farther than today's electric vehicles with their average range of approximately 150 kilometers per battery charge.

Furthermore, the partners succeeded in building the MotorBrain prototype without using rare earth metals, which are currently a fundamental cost driver in hybrid and electric vehicles. Today rare earth metals are an important component in the permanent magnet of any electric motor, generating a particularly strong, constant magnetic field. The stronger the magnetic field, the higher the performance capabilities of the motor. However, obtaining rare earth metals is extremely complicated and environmentally harmful. Also, [rare earth metal](#) prices are high and fluctuate widely. The MotorBrain electric motor therefore utilizes readily available and less expensive ferrite magnets. The lower

performance level of [ferrite magnets](#) compared to those with rare earth metals is compensated for by the specially developed high-RPM (revolutions per minute) rotor of the MotorBrain electric motor.

More information: www.motorbrain.eu/

Provided by Infineon

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