

The magic of superconductors

German engineering company evico was the subject of global media coverage this year through its partnership with Lexus. Its magnetic levitation technology formed the basis for the Lexus Hoverboard, a skateboard that almost magically hovers an inch or three above the ground. While the hoverboard will not be commercialised, the project did showcase evico's engineering prowess in the field of superconductors, says Dr. Oliver de Haas, CEO. The company is currently developing new applications of superconductor bearings for industrial automation.

evico was established in 2004 a spin-off of the Leibniz-Institute for Solid State and Materials Research IFW Dresden. Having spun off its magnetic business in 2008, the company has for the past seven years concentrated its activities on high-temperature superconductors. A new business segment was established with superconducting magnetic bearings after this technology become popular by the superconducting maglev model railway sold by evico. Meanwhile evico has installed a complete drive test facility for a transporting system based on such superconducting magnetic bearings, also proving its

competence for the realisation of challenging and time critical projects. This arguably attracted the attention of Lexus. The hoverboard project took about 18 months to complete, Dr. de Haas explains. The video of professional skateboarder Ross McGouran performing several tricks on the hoverboard, including footage of him gliding over water in a specially constructed skate park with magnetic tracks, has gone viral: it reminds global audiences of the film Back to the Future II in which hero Marty McFly rides a skateboard that floats. The (real) hoverboard is loaded with ceramic tile superconductors made of yttrium,

barium, copper, and oxygen. Liquid nitrogen poured into the board cools it to -197 degrees C. The tracks contain the magnets. They float the board at about 2 inches off the ground. The chilled board works for about 20 minutes, more or less. The hoverboard will not be commercialised but it has given both Lexus and evico plenty of good PR. Dr. de Haas emphasises that while the hoverboard, in his view, is 'a lot of fun', the fundamental technology around superconductors is serious business. Superconductors work by hovering, are resistance-free and energy efficient, in other words, potentially suitable for many applications. In a partnership with Festo, a global leader in industrial automation, evico is now looking into how the technology can be applied to sustainable production of the future. Applications in the field of frictionless, hovering bearing systems are interesting for production systems, says Dr. de Haas, particularly to industries that handle 'dirty' materials such as chemical producers. "With superconductors, completely new and previously unimaginable applications in automation technology are possible. They allow hovering, contactless movement – effectively and using little energy. The way they work without dust and wear is ideal for transporting objects in very clean environments such as semiconductor foundries in a protected manner."



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Photo by Olly Burn