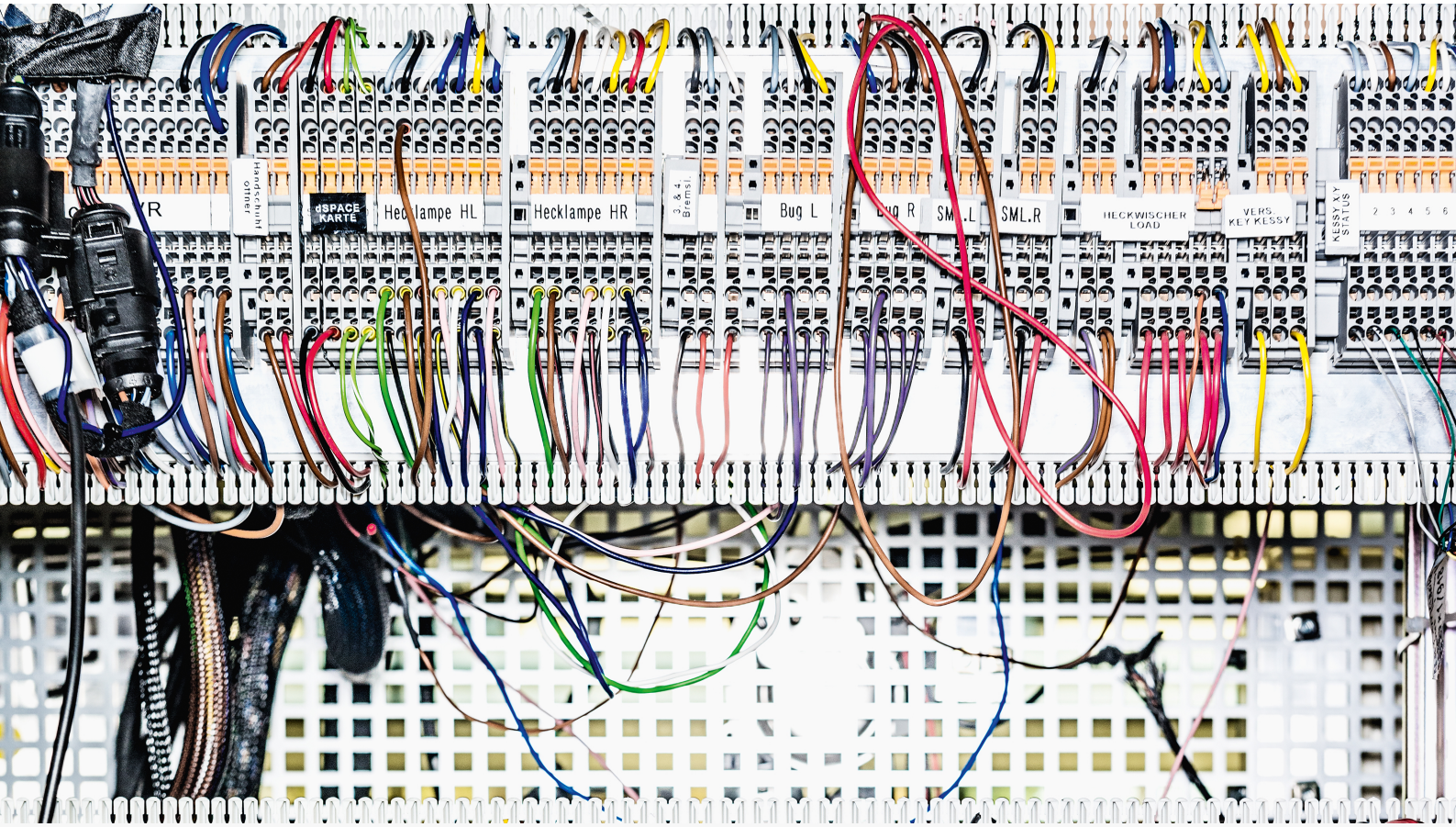

Symphony of Electronic Systems

27/04/2015 At the electronic integration center known as the EIZ, more than five hundred employees are busy conducting the Porsche technology of the future. We take a tour of this highly modern complex.

These two numbers elicit more than a little respect: a Porsche car has 6,000 different electric and electronic functions that need to be handled by as many as 80 interlinked control units. But the staff of the recently opened electronic integration center (EIZ) has every one of them in their sights. Director Uwe Michael, a native of the German state of Hesse, notes that “opening the driver's window is an example of an electric function.” But then he smiles. “The real challenges at the EIZ extend far beyond ensuring perfect electronic operation of the windows, of course.”

The rise of electronic systems in cars has accelerated to an even more amazing pace over the past ten years. “For us developers that means having to master ever greater levels of complexity,” says Michael. This task becomes tricky when numerous things are happening at the same time. Let's say you're opening the driver's window with the car in motion, while simultaneously opening the sunroof, using the GPS system, and listening to the radio. These functions are all in addition to driver assistance systems that run automatically and continually.

In order for this all-encompassing use of electronics to function in everyday driving, the EIZ houses the "CAN-Mobil" on its first floor above ground. CAN stands for "controller area network," which refers to an electronic automotive communications standard. With a good bit of imagination, this collection of cables and control units draped with an assembly of automotive components might suggest a car—minus the wheels, engine, and transmission. Here is where the engineers simulate the interplay of all electronic components in all conceivable variations. More than 100,000 test cases need to be examined. Before undergoing an endurance test in the CAN-Mobil, each individual element has already been thoroughly tested on its own.

The highest level of communication recquired

Just like an orchestra, the entire ensemble has to operate together perfectly in the CAN-Mobil. Every control unit can perform its function brilliantly as a virtuoso soloist, but that says little about its performance in conjunction with all of the members of the orchestra. Only when the control units form a successful electronic symphony are they installed in the car. The data system uses bus cables to ensure that the overall weight of the electronics remains well below 100 kilos.

The constant flow of data also requires the highest level of communication among all of the engineers involved. In order to enhance this communication, all electronics specialists have been brought together under the single roof of the new EIZ. The days in which the developers were spread across the Weissach grounds are now history.

The EIZ's architecture reflects the constant exchange of information among the engineers, technicians, and workshop staff. The interior of the building has a V-shape, based on the V-process model from software development. The rooms are arranged from above to below in accordance with the electric/electronic development process—from the idea written on a piece of paper or a computer screen to the finished component ready for use.

The workstations of the approximately 570 employees are located a maximum of 30 meters from each other—ensuring short distances for a rapid exchange of ideas, in a space that is also illuminated by stairwells in the middle of the building which are flooded with light. In planning for the EIZ, Uwe Michael and his staff placed a high priority on basing the architecture in all respects on the interplay and networking of the engineers and developers. The result speaks for itself.

The car of the future will communicate with its environment

The advantages of the EIZ have already yielded benefits for the infotainment system in the 918 Spyder. For this super sports car, Porsche developed the first system that is based entirely on the Web 2.0 programming language. "The close physical proximity of the workstations here was a major help," says Michael. The Web-based solution can be constantly updated to the latest state of the art without much effort, with the result that owners of the 918 Spyder can benefit immediately from new apps.

The car of the future will be networked with its environment—including everything from other traffic to the driver's home—and will communicate with it. Michael views this area of data use as one of the greatest playgrounds for his team over the coming years. Speed and complexity will continue to accelerate in the process. More than 10,000 signals are transmitted in cars these days, and this figure will increase by 40 to 50 percent with every new model generation.

While following the EIZ director through "his" building, it becomes clear that integration is a major key to success. "We don't develop every control unit ourselves; our core area of expertise is more a matter of integrating all of these units in the car," says Michael. The finale then takes place at what is called the "integration marketplace." As many as eighty engineers gather on the ground floor to experience the electronic symphony of the finished car. The "OK" is given only when everything functions here without a hitch.

As the tour comes to an end, Michael provides another insight into the future. "We're currently working on contrast-adaptive headlights," he says. These lights can adjust their illumination to provide less light to objects that are nearer and more light to objects that are farther away. The benefits here include considerably more homogenous lighting with lower contrasts, which also means that drivers are less blinded by super-reflective traffic signs. This function requires precision identification of objects in the automotive environment, using systems such as image-processing cameras. That music has yet to be played in standard-series cars—but the composers are hard at work on it at the EIZ.

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Dr. Ing. h.c. F. Porsche Aktiengesellschaft
Porscheplatz 1
70435 Stuttgart