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Escaping the chip trap and becoming a global leader with photonic-electronic integration

- **New VDE position paper sees major opportunity for business location through photonic-electronic integration in future-oriented fields like communications, Industry 4.0, and mobility**
- **Photonics enables extremely high data rates and is the basis for the communications technology of tomorrow**

(Frankfurt am Main, 1/22/2021) The chip shortage is shining light on the dependence of many of our industrial sectors, but it also brings with it new opportunities. VDE sees great potential for Germany and Europe as an industry location in photonic-electronic integration, the convergence of electronics and photonics. In the future, there will be hardly any technology that works without photonics, or optical communication. Only through the intelligent integration of electronics and photonics do applications like the Internet of Things, Industry 4.0, autonomous vehicles, or quantum technologies even become possible. Microelectronics requires photonics in processor technology, data communications, and sensors as a necessary supplement. Both technologies thus constitute critical infrastructure for Germany and Europe as business locations. The convergence of these two disciplines is a great opportunity for Germany and Europe. "Photonic-electronic integration is currently still at an intermediate stage around the world, anything is still possible. We need to establish targeted support programs to research photonic-electronic integrated solutions for communications and sensors in industry-led joint projects and get them ready for use in applications. We can back up our industrial sector with a strong position in research and development to further expand on our already solid standing," announced VDE while presenting its new position paper on the importance of photonics to politicians. The goal must be to achieve technological sovereignty in the two key technologies of microelectronics and photonics and channel this into new business models.

Japan sets the example

Germany is currently in fourth place for photonics internationally behind China, Japan, and the United States, and it is crucial to leverage this position for microelectronics. However, VDE criticizes the lack of long-term vision in Germany and Europe. “The Japanese have laid out a five-year plan for advanced optical transmission techniques, EXAT, with which they are expanding on their strong position in photonics and electronics and making their industrial sector fit for the future,” says Prof. Christian Schäffer, author of the VDE position paper. With this in mind, VDE is calling for a coordinated industry strategy for manufacturing photonic-electronic integrated microchips in Europe. “It is now crucial to support semiconductor manufacturers in ramping up to volume production.” Germany’s industrial sector is a world leader in power electronics and sensors with a strong position in photonics as well. By combining these key technologies intelligently, our industry has the chance to become the global market leader.” VDE’s call to action for politicians: better tax support for research and development, a reasonable reduction in the high electricity and water costs associated with production, assurance of planning security for future production costs, and financial startup support for new production facilities. “If we are strong in photonic-electronic integration, our industrial sector will have an entirely different negotiating scope in a globalized world market,” recommends VDE, which sees the geopolitical situation as increasingly difficult.

Promoting SME job creators with new cooperation

To promote Germany as a business location, the VDE experts also encourage the development of new cooperation models with the leading semiconductor manufacturers, especially to ensure that job-creating SMEs and research institutes are able to carry out their innovative development on the basis of state-of-the-art technology. The German photonics industry comprises some 1,000 companies with more than 135,000 employees. Around 50 companies and 20 universities and research institutes are working on optical communications technology in Germany. According to VDE, there is still plenty of room for improvement here. For example, the expansion of prototyping and small-series manufacturing capacity would accelerate the market introduction of research results. If the big challenges, above all in microelectronics, can be overcome, then the conditions will be excellent for Germany to take an international leading role in photonic-electronic integration – especially in future-oriented fields like communications, Industry 4.0, and mobility, where the country has been and currently is dominant.

Photonics, a market worth billions, brings extremely high speeds to the digital world

The efficient processing, distribution, and storage of information is decisive for the digitalization of our economy and society. Integrated photonic transceivers offer enormous potential for improvement over electronic transceivers here with regard to the attainable data rate, range,

energy efficiency, and compactness. Integrated optical sensors, for instance, allow spatial vision with higher resolution and at lower costs than conventional solutions. By 2025, the market for silicon photonic components alone is estimated to reach \$3.5 billion.

For editorial teams:

The two VDE position papers “Hidden electronics” and “Photonic-electronic integration – key technology for communications and sensors” are available free of charge in the VDE shop at www.vde.com/en.

About VDE:

VDE, one of Europe’s largest technology organizations, has stood for innovation and technological progress for over 125 years. This makes VDE the only organization worldwide combining science, standardization, inspections, certification, and application consulting under one roof. VDE has been synonymous with the highest safety standards and consumer protection for over 100 years. We are dedicated to fostering research and young talent as well as lifelong learning with on-the-job further training opportunities. 2,000 employees at over 60 locations worldwide, more than 100,000 volunteer experts, and approximately 1,500 companies work within VDE to create a future worth living in: networked, digital, and electric. We are building the e-dialistic future.

VDE (Verband der Elektrotechnik Elektronik und Informationstechnik e.V.) is headquartered in Frankfurt am Main, Germany. More information at www.vde.com/en.

Press contact: Melanie Unseld, Tel. +49 69 6308-461, melanie.unseld@vde.com