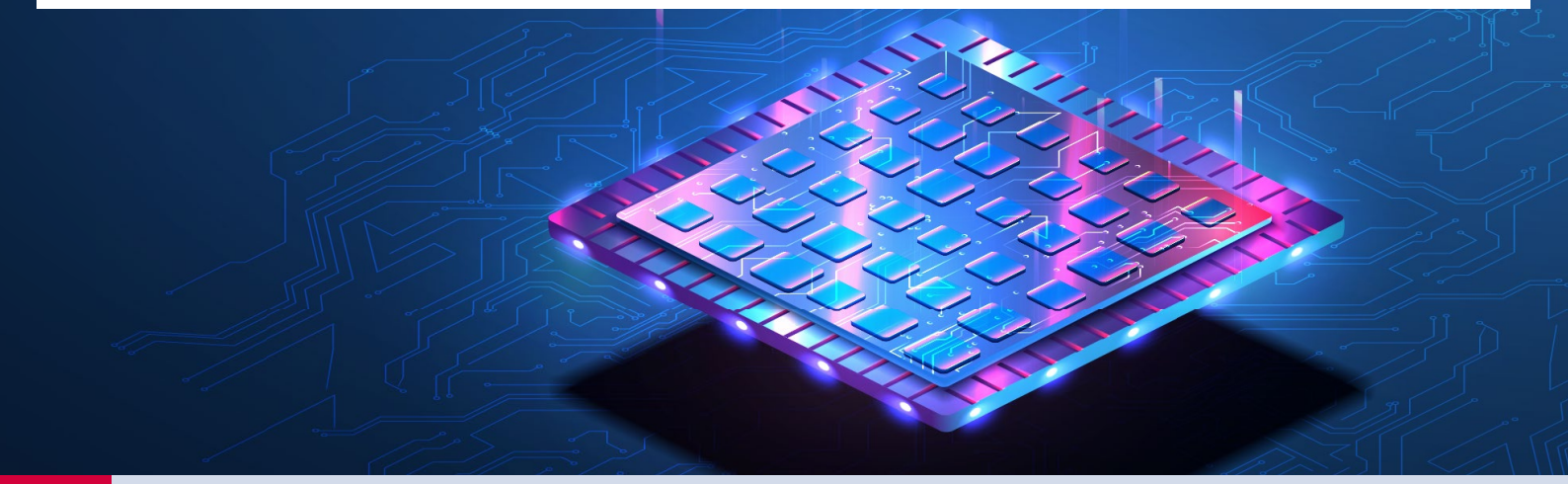
Federal Ministry
for Economic Affairs
and Climate Action

IPCEI
on Microelectronics



RACYICS GMBH

Universal 22FDX platform for IoT products and Industry 4.0

Racyics GmbH is a medium-sized company founded in 2009 and located in Dresden. It offers customised chip designs as well as consulting services for semi-conductor production. The approx. 70 employees from the research and development sector are active in four business areas of work: They advise on chip design, support small companies in gaining access to semiconductor production at GLOBAL FOUNDRIES, design chips according to customer specifications and develop building blocks for chip design, so-called IP.

Challenges

A key technology in digitisation is the Internet of Things (IoT), which enables the networking of physical and virtual objects by means of information and communication technologies. These can be found in many areas of life: from connected living to connected mobility to Industry 4.0. In the future, digital networking will also be used for more complex applications such as automated driving, Ambient Assisted Living or medical technology. This requires new types of electronic modules that are both highly specialised and cost-effective. Against this background, universally applicable development platforms for application-specific product design are of great importance. This makes it possible to provide tailormade products for small production sizes that facilitate market access, especially for small and medium-sized companies that do not have their own semiconductor production facilities.

Objective

Such a development platform is to be developed as part of the project as a so-called system-on-chip (SOC) solution, in which as many electronic components as possible are integrated in a compact design. This platform is characterised by a high degree of configurability, which means that different products, thanks to the common platform, can also be produced in small quantities to cover costs. If successful, the transition from small-series production to large-volume production could be made without great expense, with application-specific integrated circuits (ASICs) being derived directly from the chip design for large-series production. A special feature of the development platform is the selective on and off switching of individual components, which ensures a high degree of individual configurability.

Approaches

For this project, Racyics GmbH is using the so-called FDSOI technology (FDSOI - Fully Depleted Silicon On Insulator) 22FDX® from GLOBALFOUNDRIES, which is much more efficient than semiconductor technologies from other manufacturers and offers an additional option for adjusting the transistors. This allows both the unavoidable production fluctuations and the particularly disruptive influence of the ambient temperature to be largely compensated. This results in smaller chips that deliver higher processing power with less energy. The 22FDX® technology is also cost-effective and well suited for mobile applications. The platform SoC to be developed by Racyics GmbH as part of the project has a modular structure and uses widespread, if possible open

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standards. Companies that develop products and applications on the basis of the platform SoC will thus have early access to the market. This project from the technology field of energy-efficient chips is closely related to the IPCEI project of GLOBALFOUNDRIES, which is responsible for the technological development of the FDSOI technology. In addition, there is also close cooperation with Cologne Chip AG, which is developing an FPGA chip in its sub-project that is also to be manufactured using FDSOI technology at GLOBALFOUNDRIES.

Perspectives
Racyics GmbH plans to transfer the experience gained in the project from the design of efficient processor systems, configurable logic circuits and the implementation of cryptographic functions and radio interfaces to new areas of application, such as energy- efficient high-performance computing and medical technology. To this end, the company will consolidate the existing network of research institutions such as the TU Dresden, the University of Tübingen and the Fraunhofer IPMS, as well as with corporate partners such as Cologne Chip AG. By participating in the integrated IPCEI microelectronics project, Racyics GmbH can significantly expand its corporate network. With the development of efficient chip designs, the Racyics GmbH project contributes to advancing the key technology of micro- and nanoelectronics as a common European goal, providing technologies for digitalisation and the Internet-of-Things.

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