

Business

Arbe has repositioned radar, the most dependable of sensing technologies, from a supportive role to the backbone of a vehicle's sensor suite, delivering unprecedented road safety through 4D ultra high-resolution imaging. From standard maneuvering to high-risk engagement, Arbe services real-world driving needs, differentiating threats from false alarms in real-time, no matter their speed, elevation, proximity, size or the surrounding weather conditions to provide 'every-scenario' road safety. Founded in 2015 by an elite team of semiconductor engineers, radar specialists, and data scientists, Arbe's patent pending chipset solution empowers automakers and Tier 1 companies with a sensing solution 100 times more detailed than any other radar on the market, suited for every level of vehicle autonomy or class.

Challenges

- Develop Imaging Radar chipset with innovative features for today's automotive level 2 market and future autonomous vehicle demands
- Reduce cost of new high-resolution sensor SoC
- Acquire fully qualified IP on GlobalFoundries 22FDX that accelerates time-to-market while meeting AEC-Q100 and ISO 26262 requirements
- Implement efficient security solution for system boot up and networking communication

Synopsys DesignWare IP Solution

- ASIL B Ready General Purpose IO and LVDS IO*
- ASIL D Compliant ARC® EM22FS Processor**
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Benefits

- Achieved first-silicon success and beat the competition to market for 4D ultra high-resolution Imaging Radar
- Met performance and stringent ESD requirements
- Acquired ASIL Ready IP to accelerate ISO 26262 qualification
- Easily integrated security IP with pre-verified security/processor IP solution
- Received excellent support from a knowledgeable and responsive local technical support team

Overview

Arbe's patented imaging radar is a next-generation sensor specifically designed for advanced driver assistance systems (ADAS) and autonomous vehicles. The high-resolution imaging radar can sense the environment at a wide 100-degree field of view in high-resolution at the highest reliability in various weather and environment conditions, including fog, heavy rain, pitch darkness, and air pollution. It is able to create a detailed image of the road at a range of more than 300 meters (1,000 feet) and capture the size, location, and velocity data of objects surrounding the vehicle to enable safer driving and support levels 2-5 autonomous operation. Arbe collaborated with Synopsys to acquire high-quality automotive IP for the GLOBALFOUNDRIES 22FDX process, accelerating their time-to-market while meeting their safety and security requirements.

High-Quality DesignWare IP Solutions

Arbe selected a portfolio of automotive-ready DesignWare IP for their Phoenix chipset. Arbe selected the ARC EM22FS Processor because

For its real-time networking needs, Arbe selected Synopsys' configurable Ethernet QoS Controller IP with safety package, which supports Time Sensitive Networking (TSN) to reliably manage the data stream between connected devices. In addition, the 1.8V and 3.3V general purpose IOs and 2Gbps LVDS IOs met Arbe's ESD requirements for 500V CDM. "The general purpose IOs offered higher performance and increased drive strengths compared to the competitors we considered," said Bauer.

In addition to safety, security is paramount in connected vehicles, including for booting up the system and establishing secure networking connections. "Meeting industry security requirements can be challenging, but the Synopsys Security IP was very easy to integrate, allowing us to meet the necessary security standards and performance within the silicon area budget," said Bauer.

Expert and Responsive Technical Support

Arbe utilized Synopsys' responsive, worldwide support team to meet the requirements for their complex, high-performance AI SoC. "When we reached out, Synopsys' technical support and R&D teams were very proactive and responsive," said Bauer. "Our products integrate a lot of Synopsys IP, and the option to communicate directly with engineering teams helped accelerate our time-to-market."

"We have started development on our next SoC for ADAS and autonomous vehicles. Due to Synopsys' continued success in developing and delivering ISO 26262 IP, we plan to use DesignWare IP in that project as well," said Bauer.

~Avi Bauer, Vice President of Hardware Engineering at Arbe