



CASE STUDY /

## Ansys + Arbe

"Arbe is developing the most advanced 4D imaging radar chipset in the industry, with the goal to achieve truly safe ADAS and pave the way to autonomous driving. Using Ansys HFSS through the Ansys Startup Program, Arbe engineers developed package variations that exceed stripline performance with only a single RDL layer while having 4X channels per chip compared to competing solutions, while also reducing costs by 25% and speeding up time to market."

**Avi Bauer**

Vice President of R&D / Arbe

Driving a Radar Revolution: Simulating Challenging Environment Scenarios to Achieve Zero Road Fatalities.

**Advanced driver assistance solutions (ADAS) and automated driving systems must perform flawlessly in all weather and lighting conditions. Challenging environments include fog, rain, snow, highly reflective lights or full darkness. These solutions need to work on fast-moving highways and in dense urban environments with hundreds of objects surrounding the vehicle. Simulating all these scenarios in the lab allows R&D to be highly prepared, to develop best-in-class solutions and shorten the time to market.**

**/ Company Description**

Founded in 2015 by an elite team of semiconductor engineers, radar specialists and data scientists, Arbe is driving a radar revolution, 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.

**/ Challenges**

Arbe’s ultra-high-resolution 4D imaging radar chipset solution provides vehicles with unprecedented road safety at every level of autonomy using the highest RF channel count in the industry. High performance radar requires a large number of channels. Integrating these channels is a significant challenge when it comes to signal integrity at 80 GHz. We chose Ansys HFSS because it accurately predicts the device outcome and can handle the large-scale model required to simulate our chipset. Also, the Ansys Startup Program enabled us to purchase HFSS SBR+ at a substantially reduced price, which is a major benefit for new companies.

**/ Technology Used**

- Ansys HFSS SBR+

**/ Engineering Solution**

We used HFSS SBR+ to simulate a chip package with high density of channels and 80 GHz RF traces with high channel-to-channel isolation and low insertion loss. In addition, we leveraged SBR+ to emulate scenes and verify that the system meets extreme cases without leaving the lab. We found the following features to be particularly valuable:

- 3D EM simulation of high-density electronic structures.
- Easy import/export to/from other EDA tools.
- Interfaces to MATLAB system level models.
- The capability to create synthetic test cases which reflect real use cases in the lab.

**/ Benefits**

Arbe designed an innovative and proprietary (patent pending) FOWLPL package to achieve significant improvement in 80 GHz trace losses while maintaining the isolation required between adjacent channels. Using HFSS, Arbe engineers developed package variations that exceed stripline performance with only a single RDL layer while having 4X channels per chip compared to competing solutions, while also reducing costs by 25%. In addition, virtually simulating system performance saves hours of driving on the roads in an uncontrolled environment.



Test Driving Arbe’s 4D Imaging Radar Chipset Solution.



A Radar System built for Arbe’s 4D Imaging Chipset.



Arbe 4D Imaging Radar Chipset solution.



Avi Bauer, Vice President of R&D / Arbe

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