



4D IMAGING RADAR

The World's First 2K Ultra-High Resolution Radar Platform



Unparalleled high physical resolution radar enabling safe autonomous driving modes from L2 through L5 with always reliable object detection

- 4D Imaging Radar: range, Doppler, azimuth, elevation in high resolution and wide FOV
- Near zero false alarm and false negative rates for low-RCS targets like VRU's
- 4D point cloud output for sensor fusion (over Ethernet)
- SLAM software for real-time, low-latency object detection, classification and tracking of 100's of stationary and moving targets (CAN interface)
- Automatic interference avoidance and mitigation against other FMCW radar systems
- Integrated ISO26262 ASIL – B ready safety system with support for integration in ASIL – D ADAS / AV platforms
- AEC-Q100 qualified proprietary RF chipset and processor, leveraging latest 22nm process technology
- On - board security solution to protect against tampering or unauthorized access
- Compact design for easy vehicle front-grill integration
- Support for on-the-fly calibration

RADAR TARGET SPECIFICATION



Frequency Range	76 - 81GHz
Bandwidth	Up to 2GHz
Resolution (3dB Beamwidth):	
Range	9.5cm@36m, 60cm@300m
Azimuth	1.25 degree
Elevation	1.5 degree
Doppler	0.1m/s
Detections Space	
Range	Up to 300m
Azimuth FOV	-50 - + 50 deg
Elevation FOV	-15 - +15 deg
Doppler	-70 - +140 m/s
Point Cloud Data Size Per Frame	Max 250K detections (Ethernet limitation)
Max # Tracked Objects	450
Update Rate:	Up to 30FPS (4D mode)
Point Cloud update rate	
Modulation and MIMO Scheme:	Enhanced FMCW with TD-MIMO
Supported Channels	48 Transmitters, 48 Receivers
Dimensions (WxHxD)	14.3X12.7X3.8 cm
Weight	1 kg
Ceretications Qualitification	ISO - 26262 ASIL - B (D) FCC, ETSI, TELEC-Japan Arbe's Chipset: AEC-Q100

A NEW CLASS OF RADAR



Today's automotive radar solutions are limited by low spatial resolution, a disadvantage that has kept radar from being able to separate objects by *Direction of Arrival*, while maintaining low false alarms. As a result, radars have been relegated to a supportive role in automotive sensor suites.

Arbe has reconditioned radar, eliminating former resolution limitations to deliver a 2k ultra-high resolution 4D imaging radar. This is all accomplished in a wide field of view at long-range with low false alarm rates. With this technological advancement, Arbe has effectively repositioned radar from a supportive role to the backbone of the sensor suite.

TRUE 4D IMAGING

Arbe's radar generates a true 4D radar image with ultra-high resolution in range, azimuth, elevation and Doppler dimensions. This is done with highly reliable object detection, low side lobe levels (SLL), and low false alarm rates.

High-resolution imaging provides more detailed information about tracked objects, such as object orientation and boundaries, in addition to the center and velocity in much higher accuracy, making fusion with other sensors (like camera) more meaningful.

UNPARALLELED PHYSICAL RESOLUTION

Arbe's physical high-resolution relies on 48 transmit and 48 receive antennas to create a 2304 virtual channels array for digital beam forming. Rather than using unreliable synthetic or statistical resolution enhancements, like super resolution, Arbe leverages a wide aperture array to provide a physical 3dB

beamwidth of 1.25° in Azimuth and 1.5° in elevation with low SLL for increased reliability and safety at high-dynamic range. Relying on high physical resolution and high-dynamic range provides the ability to separate objects such as riding a motorcycle next to a truck, a car stuck under a bridge and pedestrian standing next to a fence or fixing a flat tire.

Arbe's high physical resolution imaging allows the system to also track moving objects, map the environment and stationary obstacles, generate free-space mapping for easy path planning, and provide accurate localization.

RADAR DEVELOPMENT PLATFORM

The 2K high resolution Imaging Radar Development Platform, or A Sample as referred to in the automotive industry, empowers Tier 1s, OEMs, and new mobility players to revolutionize their imaging radar systems and enhancing their perception algorithms. The development platform includes:

- The entire Arbe imaging radar chipset with RF transmitter and receiver chips and the patented imaging radar processor
- A radar antenna with the densest channel array in the industry, delivering a form factor designed to fit automakers' current sizing specifications.
- A software layer that abstracts the hardware access and scheduling.
- A reference design to guide tier-1 and OEM system development.

