mmWave Imaging Radar

weather proof real-time 4D point cloud mapping

AINSTEIN

Safety from numbers

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Overview

Ainstein's mmWave O-79 Imaging Radar sensor module brings an unprecedented understanding of the real-time operating environment for autonomous robots and specialty vehicles operating in complex environments. The sensor module captures details of the surrounding scene of moving objects such as vehicles, bikes, and pedestrians, as well as stationary objects including light poles, railings, etc.

Ainstein's Imaging Radar pinpoints the location of detected objects with range, azimuth, elevation, and velocity data in order to generate a 4D point cloud mapping of the surroundings.

The radar module offers LIDAR-like image quality, paired with high reliability under poor weather and low light conditions where only radar systems can perform reliably.

Ainstein's imaging radar module is designed to be easily integrated into diverse applications. It supports multiple high-speed output connections commonly required for specialty vehicles and robotics. Its ability to output radar data makes it an ideal choice for sensor fusion development.

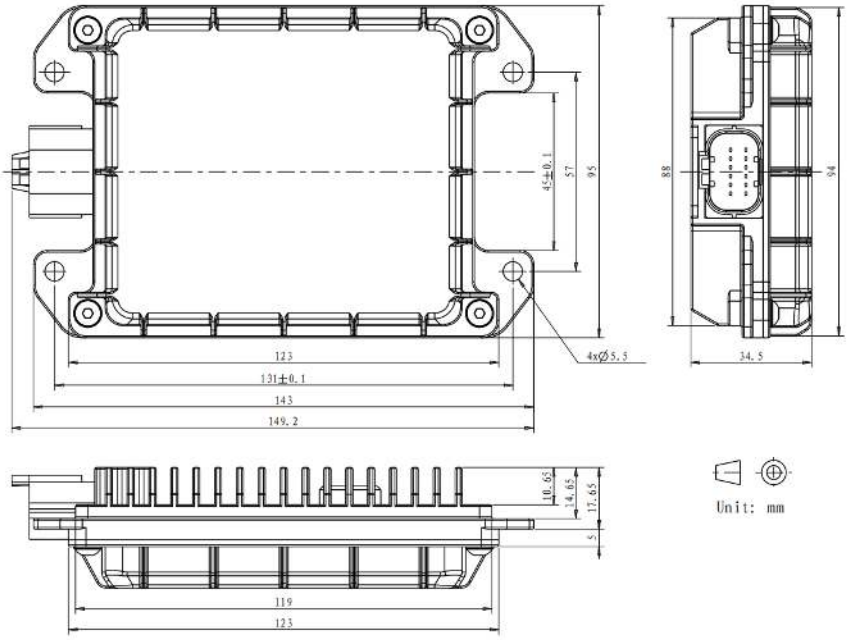
PRODUCT SNAPSHOT:

- Cascaded Chip Design, 2-Chip
- Texas Instruments AWR2243P Radar Front End
- FPGA with ARM Processor for Signal Processing
- 4D Point Cloud Data Output
- Targeted for ISO 13849-1:2015, ISO 21815, ISO 19014, ISO 13766

Specifications

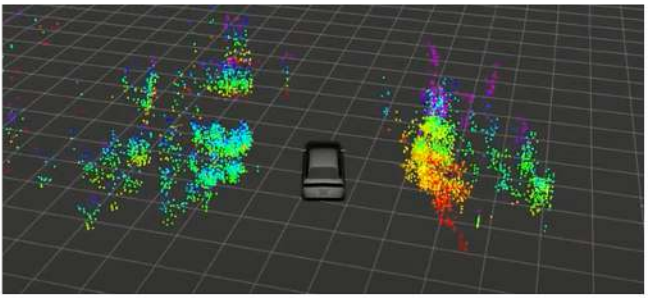
Specification:	Current:
Operating Frequency	77 GHz
Field of View (Azimuth x Elevation)	~90° x 30°
Angular Resolution (Azimuth)	~5.7°
Angular Resolution (Elevation)	~18°
Detection Range	20 m
Range Resolution	< 0.2 m
Max Velocity	2.28 m/s
Velocity Resolution	0.0357 m/s
Update Rate (Point Cloud)	5 Hz
Update Rate (Tracker)	5 Hz to 20 Hz
Interface	CAN, Ethernet
Safety Rating Target	SIL2
IP Rating Target	IP 67

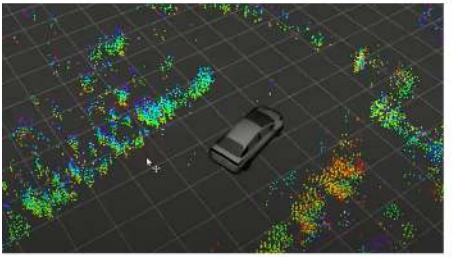
Mechanical Drawing



Application

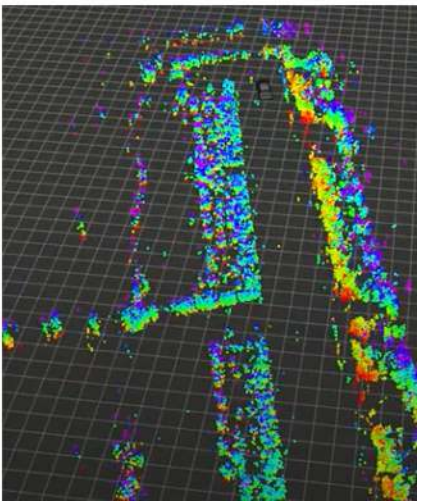
The O-79 offers LIDAR-like image quality, paired with the high reliability under bad weather and low light conditions that only radar systems can provide. Below is real data which could be replicated with a GPS and data processing.

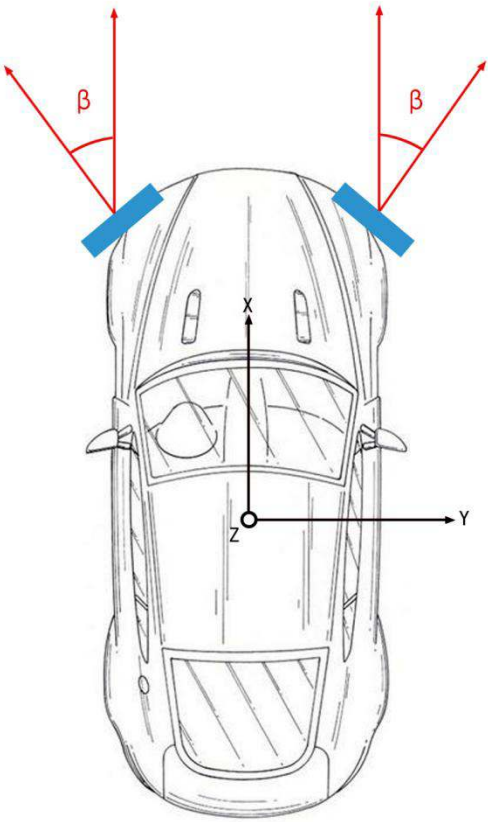




PURPOSE-BUILT FOR SELF-DRIVING INDUSTRIAL TRUCKS, TRACTORS, SPECIALTY VEHICLES, AND MORE

ENDLESS AUTONOMOUS AUTOMOBILE APPLICATIONS.

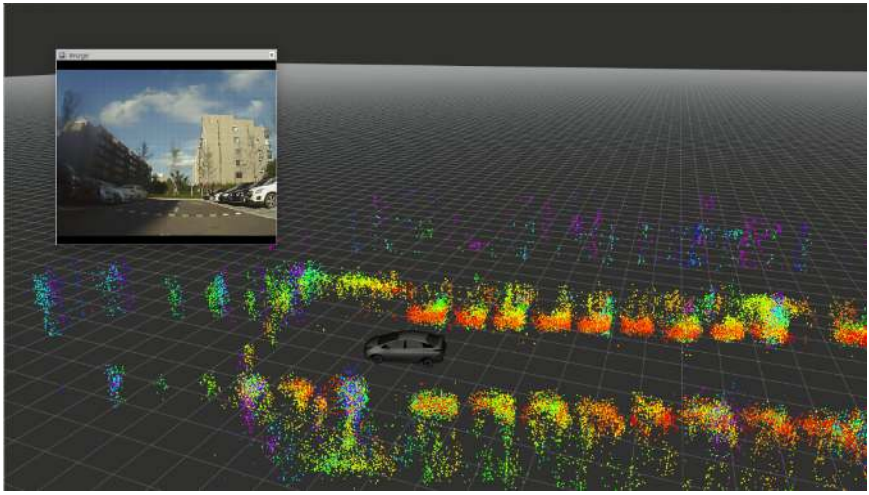




Ainstein's O-79 Vehicle Imaging Radar opens doors to unlimited possibilities for self-driving X:

- self-driving excavator
- self-driving snow remover
- self-driving shuttle
- self-driving sweeper
- self-driving forklift
- self-driving lawn mower
- and more

Combining advanced radar system design and low-cost commercial radar components, Ainstein brings high resolution radar imaging to commercial applications, something that was previously available only to the scientific community.



O-79 is the first to market commercial imaging radar system optimized and validated in low light and even incredibly dusty underground conditions.

It has been deployed to enable unmanned operation of Borer Miners and Bridge Conveyor to automate excavation and removing excavated material, a much safer and highly productive solution for underground mining.

O-79 is designed to be easily integrated into diverse applications. It supports multiple high-speed output connections commonly required for passenger cars, construction vehicles, and robotics.

About Ainstein

Our mission is to enable safer driving, flying, working and living through radar-based technology. We are in the business of improving safety and protecting valuable assets through innovations in radar technology.

Ainstein makes radar systems smarter, more affordable and easier to deploy. We offer complete solutions for autonomous drones, advanced driver-assistance systems (ADAS), autonomous vehicles and industrial sensing – incorporating a combination of millimeter wave (mmWave) radar, sensor fusion and artificial intelligence (AI).

For years, cost, weight and performance constraints have hindered the wider adoption of radar. Ainstein makes radar systems accessible to everyone by overcoming these constraints. One recent innovation: we've developed the world's first UAV collision avoidance radar with 4D detection.

Radar systems and sensor data processing intelligence are keys to our autonomous future. We offer deep scientific, mathematical and engineering expertise along with a full spectrum portfolio (24GHz, 60GHZ, 76-81GHz) of hardware and software to support our customers in developing highly customized solutions with unmatched precision in unpredictable environments.

Our core team has more than a combined 100 years of experience in radar research and development with deep knowledge gained through projects funded by NASA, the U.S. National Science Foundation (NSF), the European Space Agency and others.

Other radar companies are at least two to three years behind Ainstein. Startups have been slow to market and are unable to produce at scale, while established companies are slow to adopt the newest technological innovations.

Ainstein products can be fully customized to specific application requirements, have unmatched precision in ALL weather conditions and surface types, and are a fraction of the price of competitive products.

Visit our website (www.ainstein.ai) for more information, or get in touch with Andrew Boushie, Vice President for Strategy and Partnerships, at andrew.boushie@ainstein.ai to arrange a phone call.