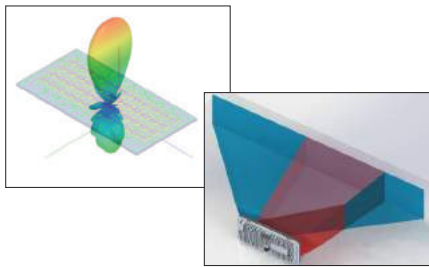


Technology

Possessed technology



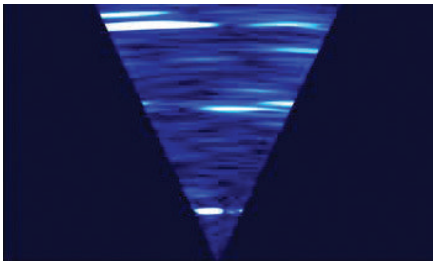
Millimeter wave circuit design

- 1 Array antenna design technology which considers radar beam synthesis
- 2 Maximized implementation of radar detection area by applying low-noise low-loss millimeter-wave circuit design technology



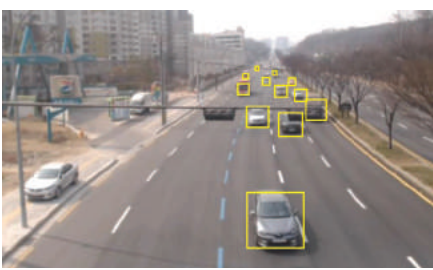
Embedded system design

- 1 Embedded processor based radar design (DSP/MCU, ARM, Multi-core processor)
- 2 Ensure drive stability through embedded demonstration and reduce system construction costs



Digital beam-forming

- 1 A technique of digital beam-forming by controlling the phase of arranged antenna module.
- 2 Improve detection performance by controlling beam shape and direction

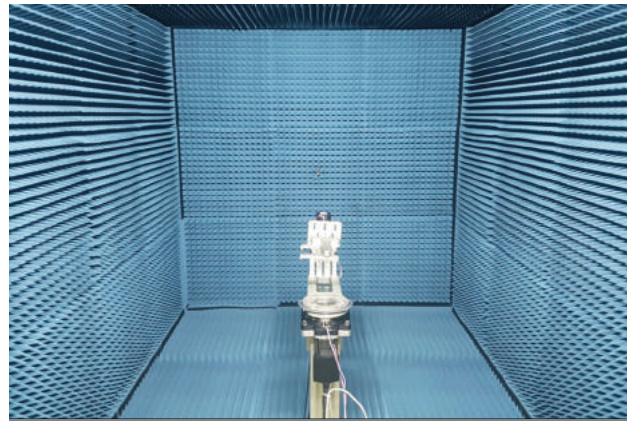


Radar signal processing

- 1 Extract distance, velocity, and angle components of a target in complicated road environments
- 2 A technology which simultaneously tracks multiple targets in real-time

Facility

Facilities, equipment



Chamber & Target Simulator



PCB process line

BSS-RAD-GEN1 V2 & V4 SPECIFICATION

Sensor Performance Specifications



• Two types of radar sensors applicable for various applications

1) BSS-RAD-GEN1 V2

- Medium-range wide sensing area

2) BSS-RAD-GEN1 V4

- Long-range narrow sensing area

Performance		Specification	Unit
Sensor Requirements			
Coverage	Range	1.5 ~ 250.0 (V2) or 1.5 ~ 350.0 (V4)	m
	Velocity	≤ 250	kph
	Azimuth FoV	± 10 (V2) or ± 20 (V4)	°
Electrical Requirements			
Supply Voltage		12	V
Supply Current		Max. 0.5	A
Operational Voltage Range		9~24	V
Mechanical Requirements			
Sensor Dimension		175 x 115 x 25.5	mm3
Weight		< 550	g
Environmental Requirements			
Operational Temperature Range		-40 ~ 85	°C
Storage Temperature Range		-40 ~ 105	°C
Degree of Protection (IP Rating)		IP67	
General Requirements			
Frequency Band		24.05 ~ 24.25	GHz
Communication Interface		10/100 Ethernet RS-485 (Full-Duplex) CAN 2.0 or FD	-

- Accessories sold separately for product operation and installation (standard cable and standard bracket)

• Various communication interface support

- 10/100 Ethernet
- RS-485 (Full-Duplex)
- CAN 2.0 or FD



- Selectable among the above interfaces according to customer requirements

• Durable sensors in outdoor environments

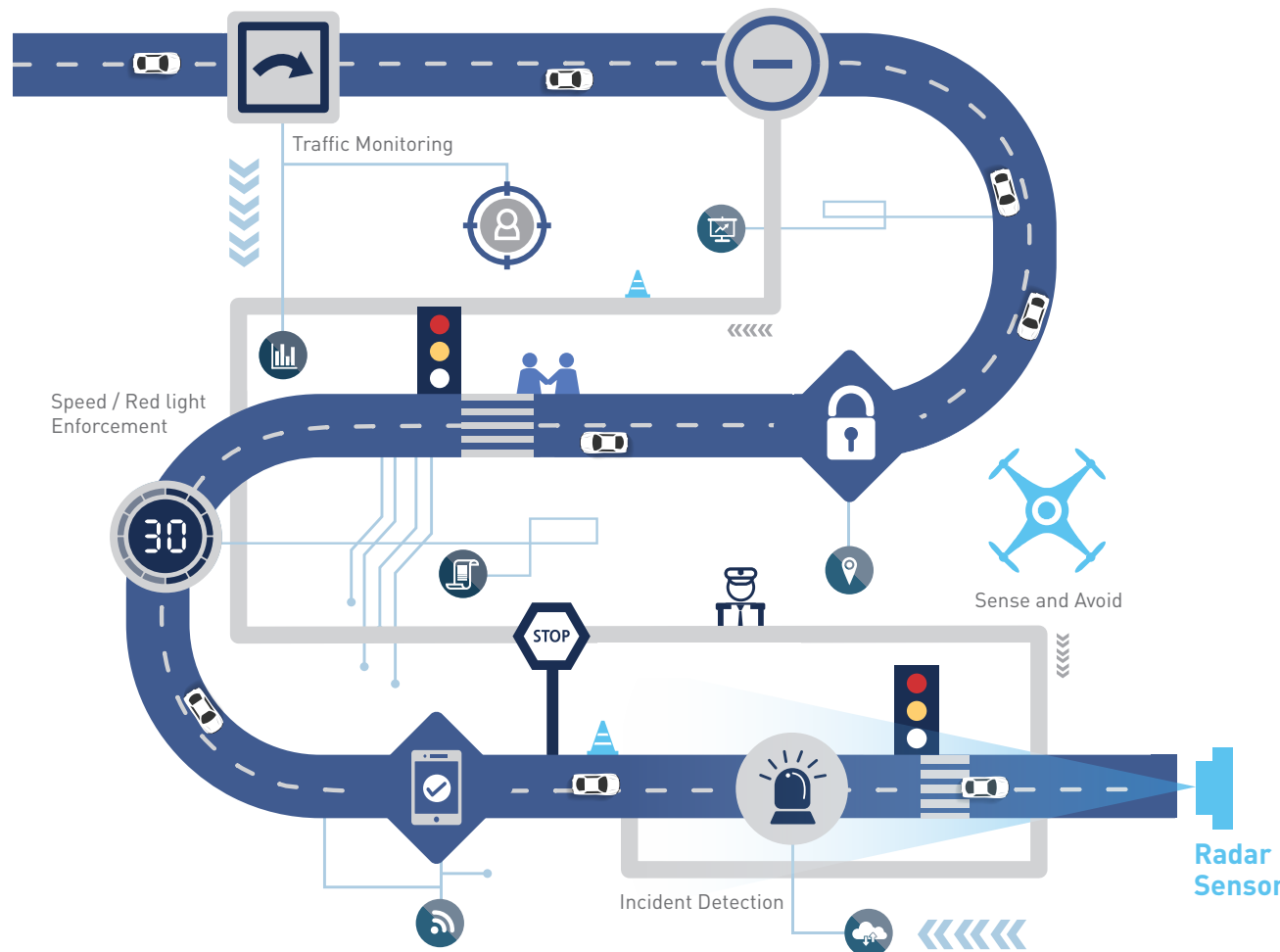
- Wide-operating temperature range (-40 to 85 °C)
- High sensor case protection rating (IP67)



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www.bydasensor.com Contact bc.kim@bydasensor.com

BYDA's Radar

For Tomorrow's Smart Traffic



Company Overview

Vision and Goals

BYDA is a radar technology company that has upgraded the ICT industry via self-developed high-frequency circuits and antennas

BYDA CO., LTD. is a traffic radar company established in October 2015 by radar specialists who have experience in the development and mass-production of radar sensors. The company independently develops and produces all products, from antenna and RF circuit design to radar signal processing. Its traffic radar products have become among the best in the world by using multi-channel transceiver structures, digital beam-forming techniques, and by providing stable performance in complex road environments. The company has obtained domestic and overseas certifications for detection and speed accuracy performance, and its products are applied to traffic application areas, such as enforcement of speeding, red light violations, and traffic volume measurement. As a new company entering the ITS market, we will be a company that prioritizes customer value by responding quickly and actively to customers needs while offering products at reasonable prices.

History

2015.10

Foundation of
BYDA CO., LTD

2015.12

Venture company registration
Patent application / registration
– Multi-beam generating radar device

2016.01

Establishment of affiliated
research institute

2016.04

Patent application
– Traffic radar device, traffic
prediction system, and traffic
measurement method

2016.06

Factory registration
(Registration of Direct Product
Manufacturing Certificate)

2016.08

Supply agreement with
Seoul's Seocho District
Office for speed warning
system

2016.12

Selected as one of 300 K-Global companies
by the Ministry of Science, ICT, and Future
Planning (MSIP)

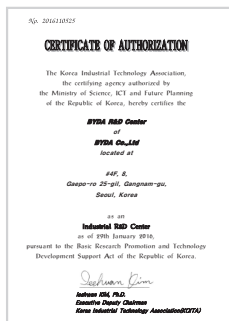
2017.01

MOU with Kyrgyzstan's enforcement
system

Selected as a company to be nurtured
by Gyeonggi Province's Creative Economy
Innovation Center



The MSIP's K-Global 300



Certificate for affiliated
research institute



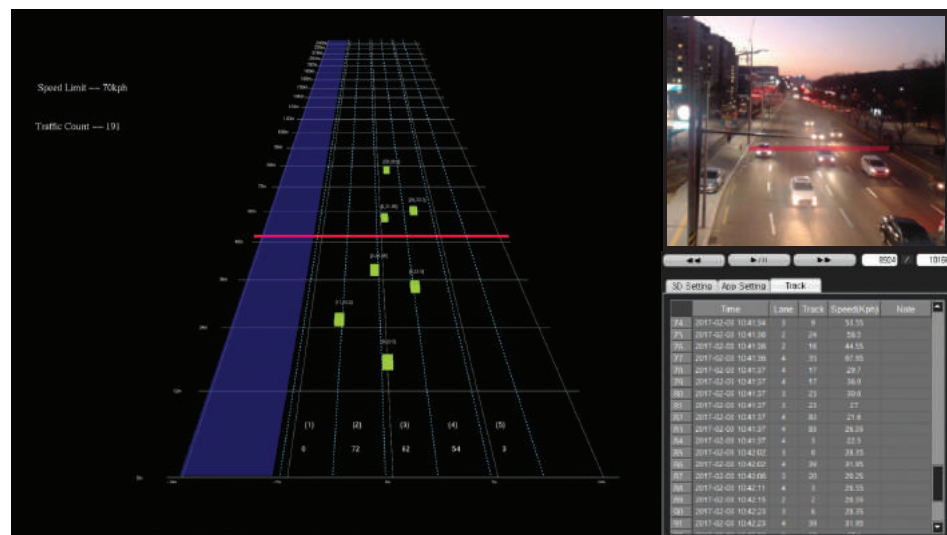
Patent on multi-beams

Applicable Areas

VDS

Vehicle Detection System

- 1 Per-lane vehicle detection
- 2 Vehicle speed / traffic volume collection
- 3 Collect traffic occupancy information
- 4 Provide customized camera trigger signals

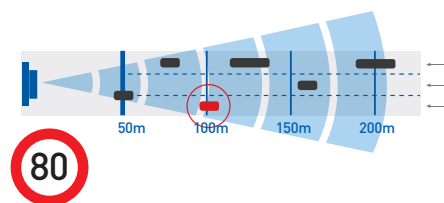


Various fields, such as enforcement systems, VDS, or DFS can utilize independently developed radars, which provide accurate direction and lane information as well as distance and speed information. Until now, these systems are not available from existing radar companies.

A vehicle detector that collects data on traffic conditions, such as vehicle detection or per-lane traffic volume, speed, and occupancy

Speed Enforcement System (Fixed)

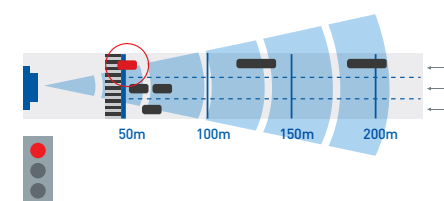
- 1 Vehicle detection
- 2 Speed detection
- 3 Lane identification
- 4 Provide customized camera trigger signals



The system detects/distinguishes vehicles present in each lane within its detection area, identifies vehicles which are going over the speed limit, and provides digital trigger signals.

Red light Enforcement System

- 1 Per-lane vehicle detection
- 2 Detect vehicles that cross stop lines
- 3 Provide customized camera trigger signals



The system detects vehicles stopped at a stoplight at a specific point on the road, detects vehicles which run red lights, and provides digital trigger signals to enforcement cameras.

DFS

Driver Feedback Sign

This traffic safety system detects an approaching vehicle and its speed and shows the speed of the car to the driver on a speed warning board in order to protect pedestrians' safety.

• A smart traffic product which encourages drivers to decelerate by issuing warnings (red letters, phrase displays, etc.) when a car goes over the speed limit.



R&D

Government R&D projects

2016.05.01

(Ministry of Science, ICT, and Future Planning)
– Development of ground detection radar for unmanned aerial vehicles

(Startup Promotion Association)
– Development of millimeter-wave radar sensor for multi-lane speeding enforcement

2016.07.01

(Small and Medium sized Business Administration)
– Development of radar-based multi-lane detection technology and smart traffic service

2016.12.22

(Ministry of Commerce, Industry and Energy)
– Development of SoC for flight control system to downsize drones

Competences

Development Areas

Traffic Radar Sensor

- Integrated control radar for urban intersection control
- Real-time car traffic volume / speed measurement
- Driver Feedback Sign warnings per lane (DFS)

Anti-collision radar sensor for drones

- Altitude measurement radar for drones
- 360 degree anti-collision radar for drones
- Height measurement radar for helicopters

Radar sensors for facility security

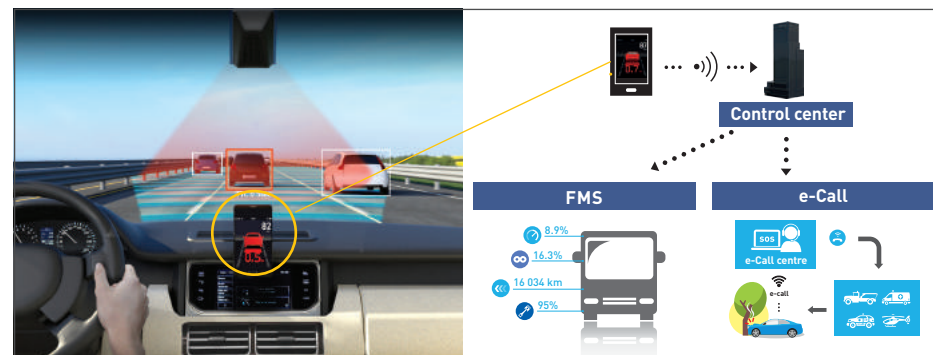
- Surrounding fence type surveillance radar
- Internal monitoring radar for major facilities
- Low-cost motion detection radar

Parking Guidance Radar Sensor

- Parking monitoring for large outdoor parking lots
- Monitoring of residents' priority parking spaces in city centers

Radar sensor for ADAS

- Provides relative speed, distance, and location information for vehicles located in front of the vehicle
- FCWS / AEBs applicable forward looking radar



BYDA's differentiated strengths

- 1 Securing quality through independent development, possessing manufacturing technology, and quick technical / sales support
- 2 Reasonable pricing and cost reduction via optimized design
- 3 Increase operator convenience by simple installation and minimized maintenance and repair
- 4 Excellent Vehicle Separation Capability achieved through accurate distance, speed, and directional information of vehicles