No: HURYS-J2610005

500m Long-Range Detection Radar White Paper

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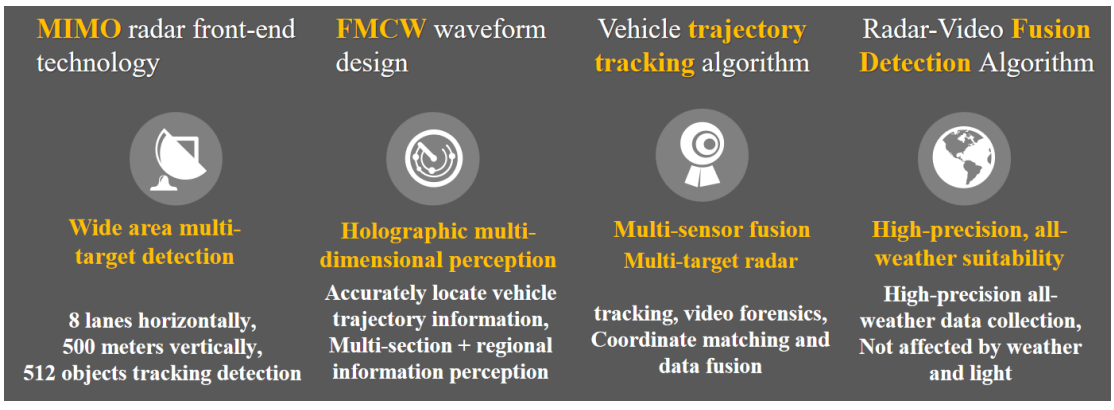
1. Product Introduction

The DTAM D49-V Radar-Video Fusion Microwave Detector is a microwave vehicle detector independently developed by our company. It features a wide detection range, high detection accuracy, and stable detection performance. It can cover 8 lanes in both directions, with a maximum detection length of 500 meters. It adopts the most advanced traffic target tracking algorithm in the industry, enabling accurate tracking of 256 targets within the area. Even in high-density and low-speed environments, it still maintains excellent detection results.

In addition, this radar integrates a video module, which can overlay and display all the target information detected by the radar on the video image in real-time. By deeply integrating the radar and video sensors, it dynamically perceives the overall traffic information and collects multiple types of application data in real-time, including real-time traffic operation status data, traffic flow data, passing vehicle data, traffic emergencies, and vehicle types. This enriches the high-precision data resources, constructs a high-speed integrated multi-perception system, and supports the dynamic management of highway traffic.

2. Product Features



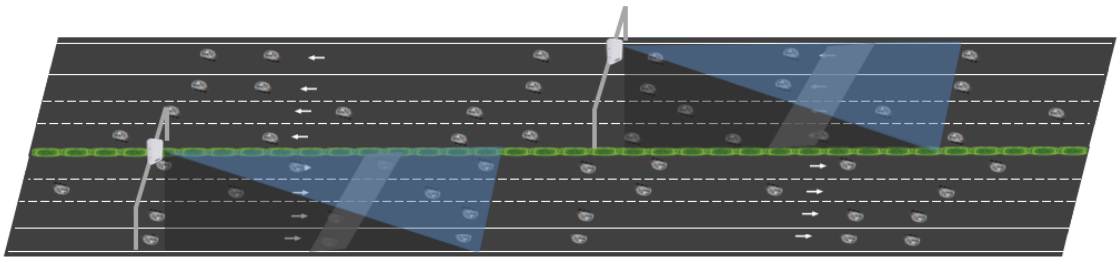
- Supports multi-lane and large-area object detection, capable of accurately outputting information such as speed and position. It provides horizontal coverage for up to 8 lanes and longitudinal coverage from 25 to 500 meters.

- Integrates radar and video in a unified design. The multi-sensor fusion mode enables multi-object radar tracking, coordinate matching, and data fusion.
- Incorporates the functions of traditional microwave vehicle detectors, offering data such as vehicle speed, traffic volume, headway time, vehicle classification, queuing, and space occupancy rate.
- Detection accuracy: traffic flow accuracy ≥95%; queue length accuracy ≥90%; event detection accuracy ≥90%, based on typical traffic scenarios.
- Supports the detection of pedestrians, non-motor vehicles, large and small vehicles.
- Radar supports NTP time synchronization and manual time setting.
- The radar operates reliably under all weather and lighting conditions, unaffected by rain, snow, fog, or ambient light.

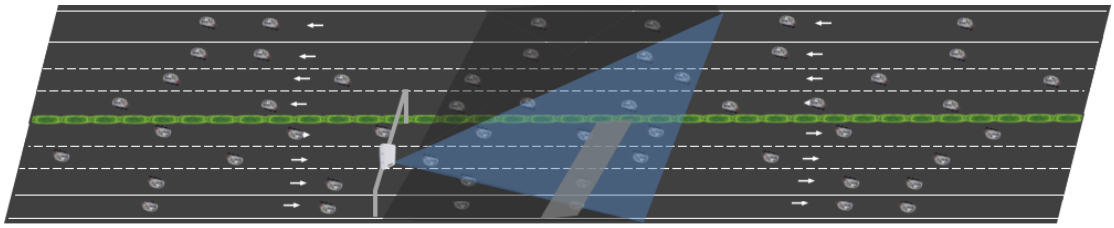
3. Installation Instructions

The road section scenario is usually divided into front-mounted and side-mounted installations. The front-mounted installation is usually on the gantry, and the side-mounted installation can be on the side pole of the gantry or the L-shaped pole by the roadside. The recommended installation height is 8 - 12m, and it should be installed horizontally.

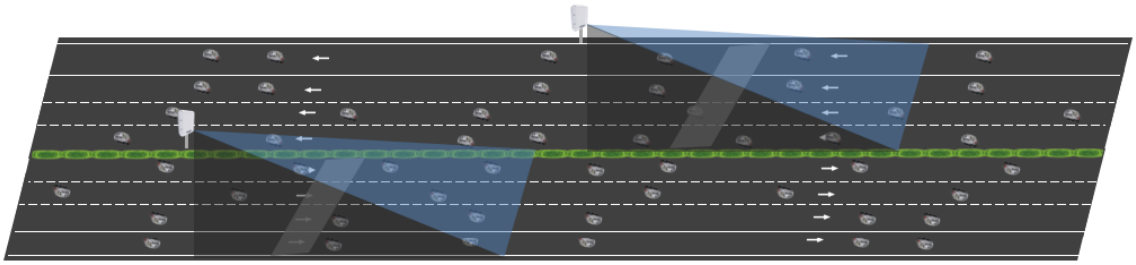
Method 1: Gantry Installation to Cover One-way Lanes



Method 2: Gantry Installation to Cover Two-way Lanes



Method 3: Roadside Installation to Cover One-way Lanes



4. Application Instructions

As a typical representative of the new generation of long-distance microwave detectors, the DTAM D49-V provides a new solution for systems such as road section information collection and traffic event detection with its wide-area multi-target detection, multi-mode behavior tracking, and multi-dimensional data mining technologies.

4.1 Road Section Traffic Flow and Event Detection

Through all-weather real-time tracking and precise positioning of vehicles in a large area by radar-video fusion, and by matching and calculating with lanes, it detects various traffic events such as high/low speed, abnormal parking, reverse driving, congestion, pedestrian intrusion, and illegal lane changes. It uploads the alarm information to the platform, providing accurate event early warning information for traffic management departments and ensuring the accuracy of events. Compared with video event detection, the DTAM D49-V has a longer coverage range for detecting abnormal parking; it has a more flexible reaction and more efficient processing for lane change detection, and can quickly analyze multiple lane change

events in the area simultaneously; it can accurately classify the congestion level for slow-moving congestion and report it in real-time in seconds.

Table 1: Traffic Data

Number	Data Items	Data Composition
1	Real-Time Data	ID，Px，Py，Vx，Vy，Object Type
2	Passing Vehicle Data	Section ID, Lane ID, Entry Time, Exit Time, Presence Duration, Entry Speed, Exit Speed, Object Type
3	Statistical Data	Statistic Time, Statistic Interval, Section ID, Lane ID, Vehicle Volume, Average Speed, Headway (Time Headway), 85th Percentile Speed
4	Incident Data	Time, Lane ID, Incident Type (High-Speed / Low-Speed, Abnormal Stop, Reverse Drive, Congestion, Pedestrian Intrusion, Illegal Lane-Changing, etc.)

5. Product parameter table

Table 2: Radar parameter

No	Specifications	Parameters
1	Frequency Band	80GHz
2	Coverage	8 lanes in both directions
3	Simultaneous Detection	Up to 512 objects
4	Maximum Detection Range	25 ~ 500m
5	Range Accuracy	0.5m
6	Range Separation	1m
7	Range of Speed Coverage	-200km/h～+200 km/h
8	Speed Accuracy	0.1m/s
9	Speed Separation	≤±0.25m/s
10	FOV	Near beam 90° (horizontal)/18° (vertical) Far beam 18° (horizontal)/18° (vertical)
11	Angle Accuracy	0.2°
12	Angle Separation	Far Range: 1°；Mid Range: 3°；Short Range: 7°

Table 3: Video Parameters

Serial number	Parameter item	Parameter requirements
1	Sensor	1/2.5-inch CMOS

2	Lens	12mm fixed-focus lens
3	Pixels	3840 x 2160 px
4	Video field of view	26°
5	Picture encoding format	JPEG
6	Video docking protocol	Supports docking with ONVIF protocol and national standard G28181 protocol
7	Network protocol	Supports TCP/IP, HTTP, DNS, RTP, RTSP, and FTP transmission
8	Minimum illumination	Color: 0.1Lux@(F1.2, AGC ON); Black and white: 0.01Lux @(F1.2, AGC ON)
9	Maximum resolution	3840 x 2160
10	Compression standard	H.265/H.264/MJPEG
11	Video frame rate	Main stream: 3840 x 2160, 2560*1920, 2560*1440, 1920*1080, 1 - 20 frames per second Sub - stream: 1280*720, 704*576, 640*480, 352*288, 1 - 20 frames per second
12	Output bit rate	Adjustable from 16kbps to 20Mbps

Table 4：Other radar parameters

No	Specifications	Parameters
1	Operating temperature	-40℃～+70℃
2	Working voltage	DC 24V（Wide voltage range: 20～28V）
3	Working humidity	0～95%
4	Power Consumption	≤13 W
5	Installation height	8～12 meters
6	IP rating	IP67

6. Hardware interfaces and dimensions

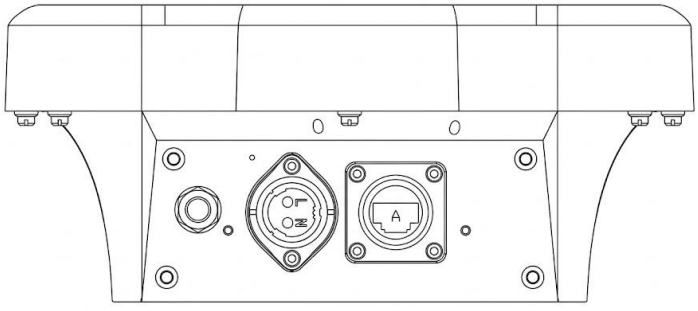


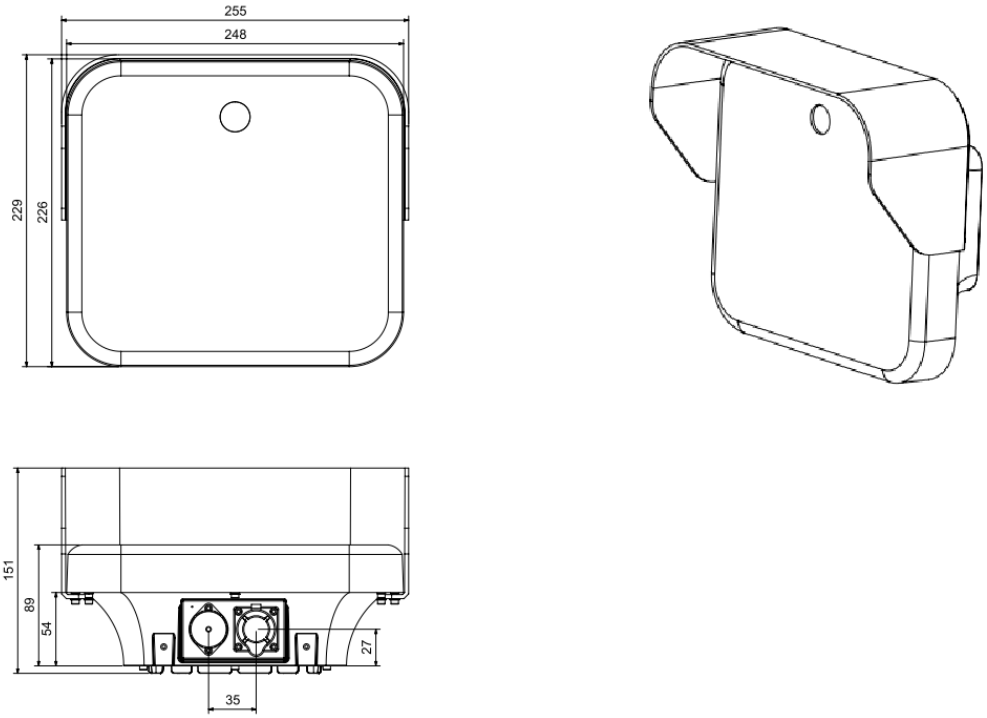
Table 5: Functions corresponding to each interface

Mark	Name	Description
L	V+	DC 24V
N	V-	GND
A	RJ45	Interface

Notes:

✧ It is strictly forbidden to use AC 220V voltage to directly power the radar.

✧ When selecting the installation point, avoid placing the radar too far away from the power supply or transmission node. If the radar data transmission exceeds 80 meters, optical fiber must be used for link access.



DTAM D49-V Layout

Table 6: Product dimensions

No.	Parameter name	Description
1	Dimensions	255mm×229mm×151mm(Length * Width * Height)
2	Weight	1600g
3	Material	PC