



TraffiClair Monthly Updates

2024.08

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ClairWav Radar Highway Management Platform



The ClairWav Radar Highway Management Platform is developed based on GIS (Geographic Information System) technology. It integrates data from physical devices like radars, cameras, and edge computing units deployed along highway sections, utilizing data fusion techniques to standardize and integrate highway traffic data. The system supports real-time data collection, statistical analysis of the collected traffic data, and employs visual simulation technology to accurately and intuitively reflect highway traffic conditions.

The platform provides real-time monitoring and early warning of abnormal events, assisting managers in maintaining real-time awareness of highway operations. It offers valuable data for traffic forecasting, information services, and supports highway management authorities with traffic data for decision-making assistance.

[View full video on Youtube](#)

[Product webpage](#)

ClairWav Radar Urban Traffic Management Platform



The ClairWav Radar Urban Traffic Management Platform integrates traffic information within the road network, building a comprehensive road traffic data archive. It includes traffic analysis, traffic situation simulation, and equipment maintenance management, forming a big data platform for road network traffic.

The key functions include:

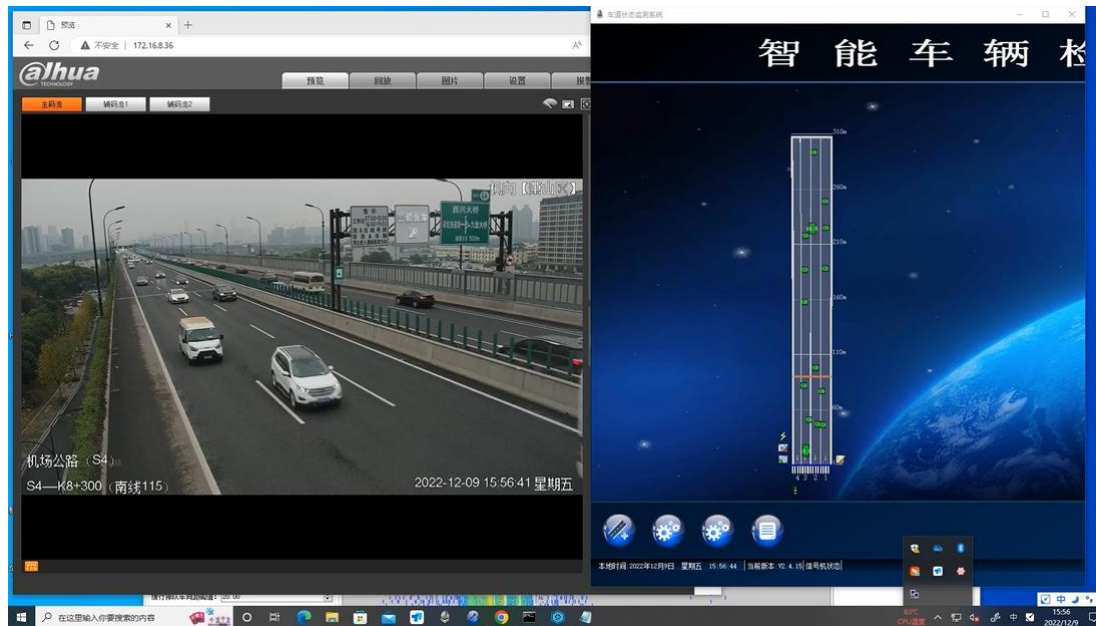
- Custom Display of Traffic Metrics
- Detailed Display of Intersections
- Route Congestion Status Display and Green Wave Diagnosis
- Evaluation of Intersection Signal Cycle Plan Effectiveness
- Recommendations for Optimizing Intersection Signal Control Plans
- Data Analysis: Traffic Flow Analysis
- Visualization of Traffic Data Analysis
- Multi-dimensional Comparison of Traffic Data Across Different Intersections
- Historical Route Condition Playback
- Full Lifecycle Monitoring of Equipment
- System Management

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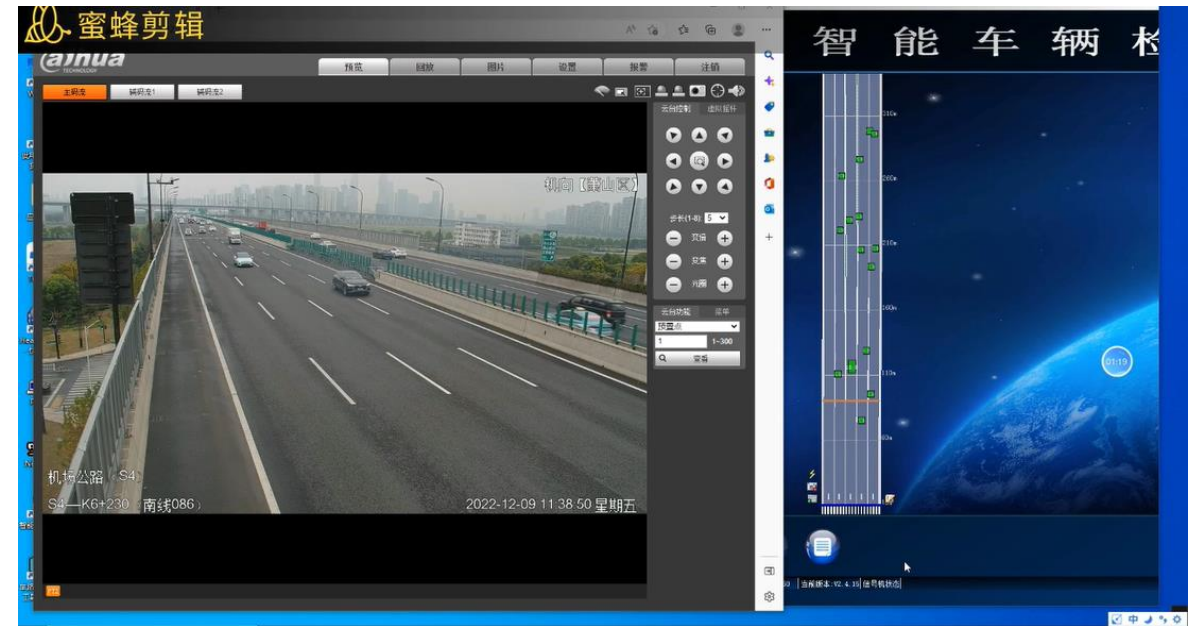
ClairWav Radar Detection Result Live Demo

300m Straight Road (without Sound Barrier)



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300m Straight Road (with Sound Barrier)



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ClairWav Radar Detection Result Live Demo

Highway Split Point



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Highway Merge Point



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ClairWav Radar Detection Result Live Demo

Curved Road



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Straight road with road median strip with greenery

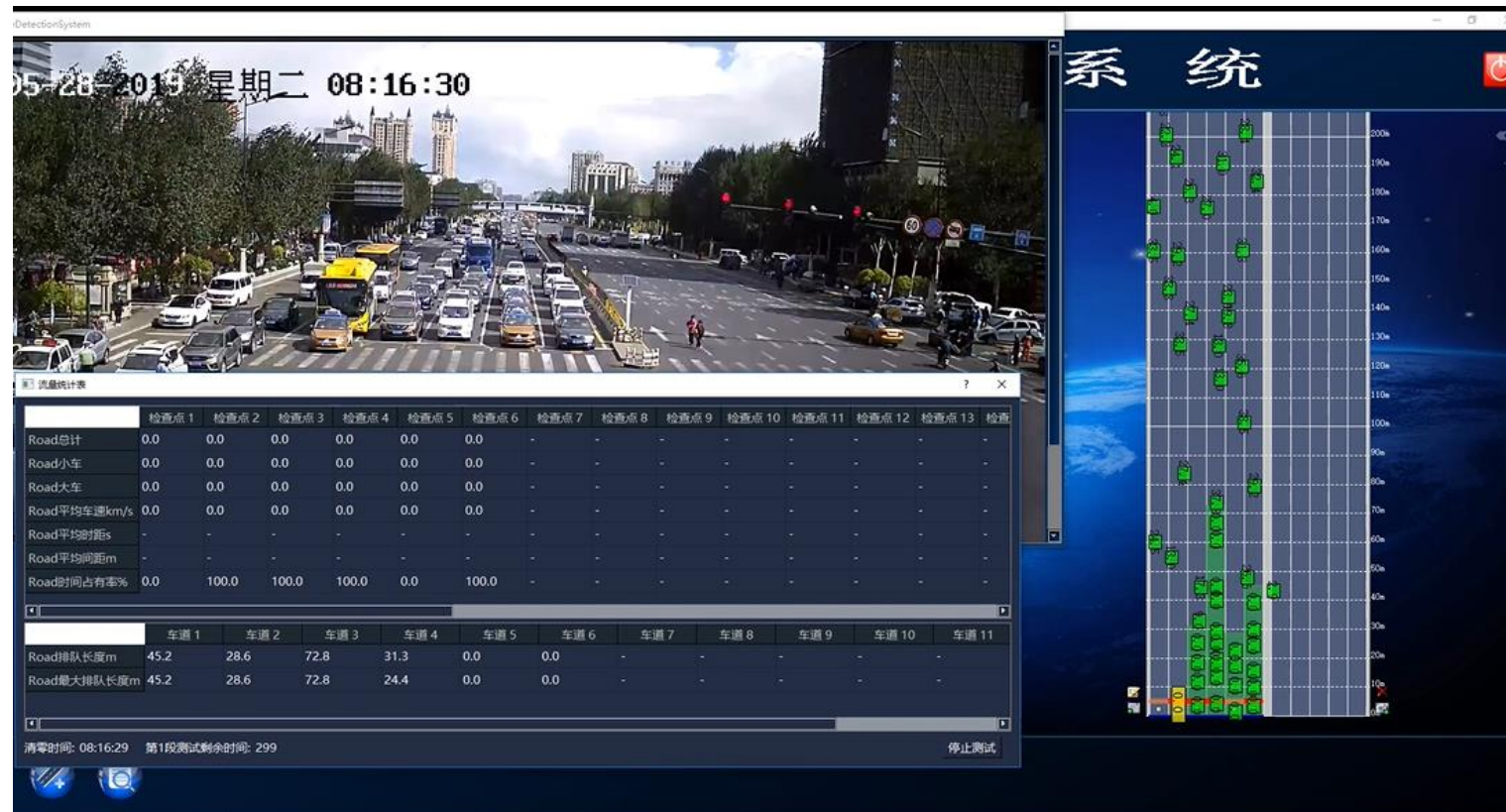


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ClairWav Radar Detection Result Live Demo

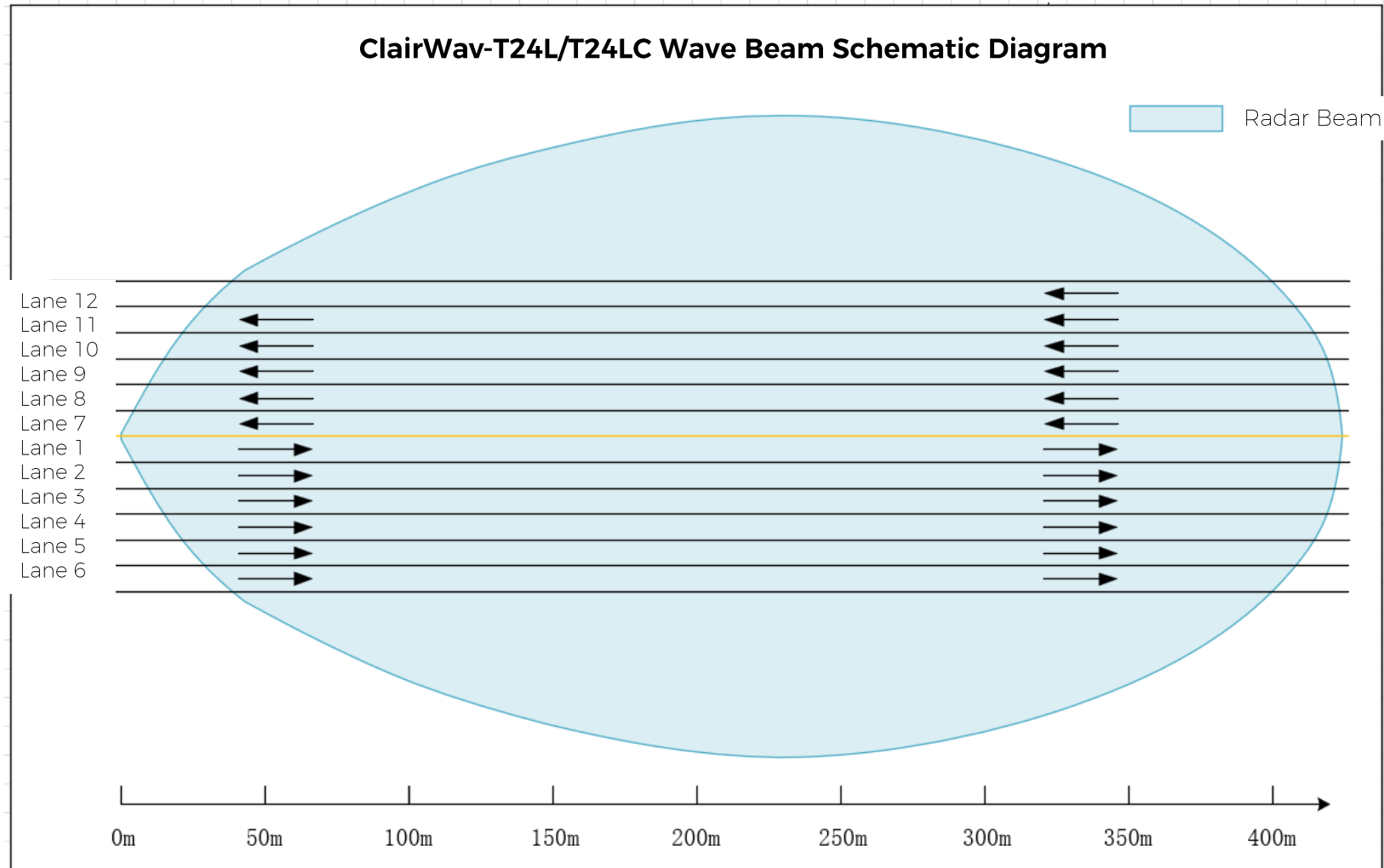
Morning peak of an intersection



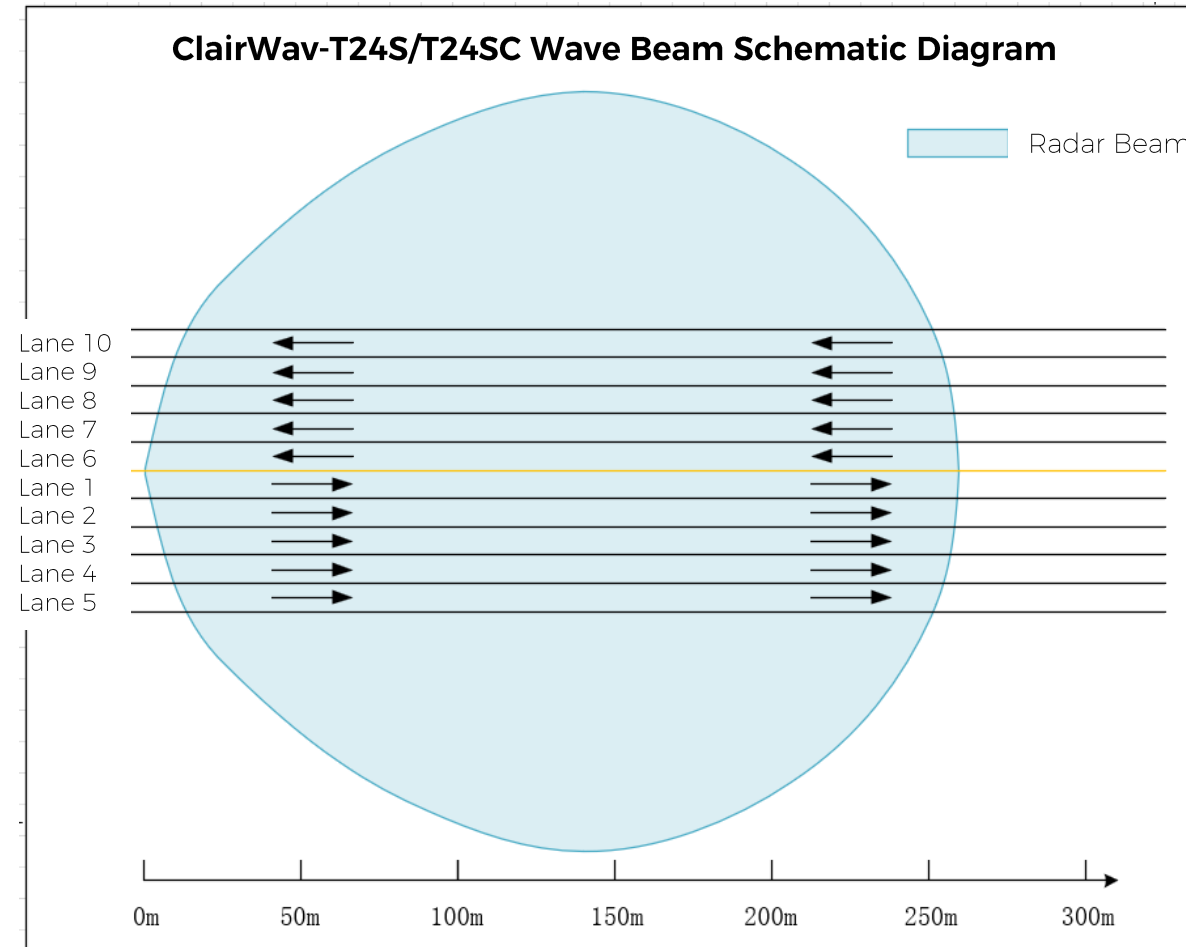
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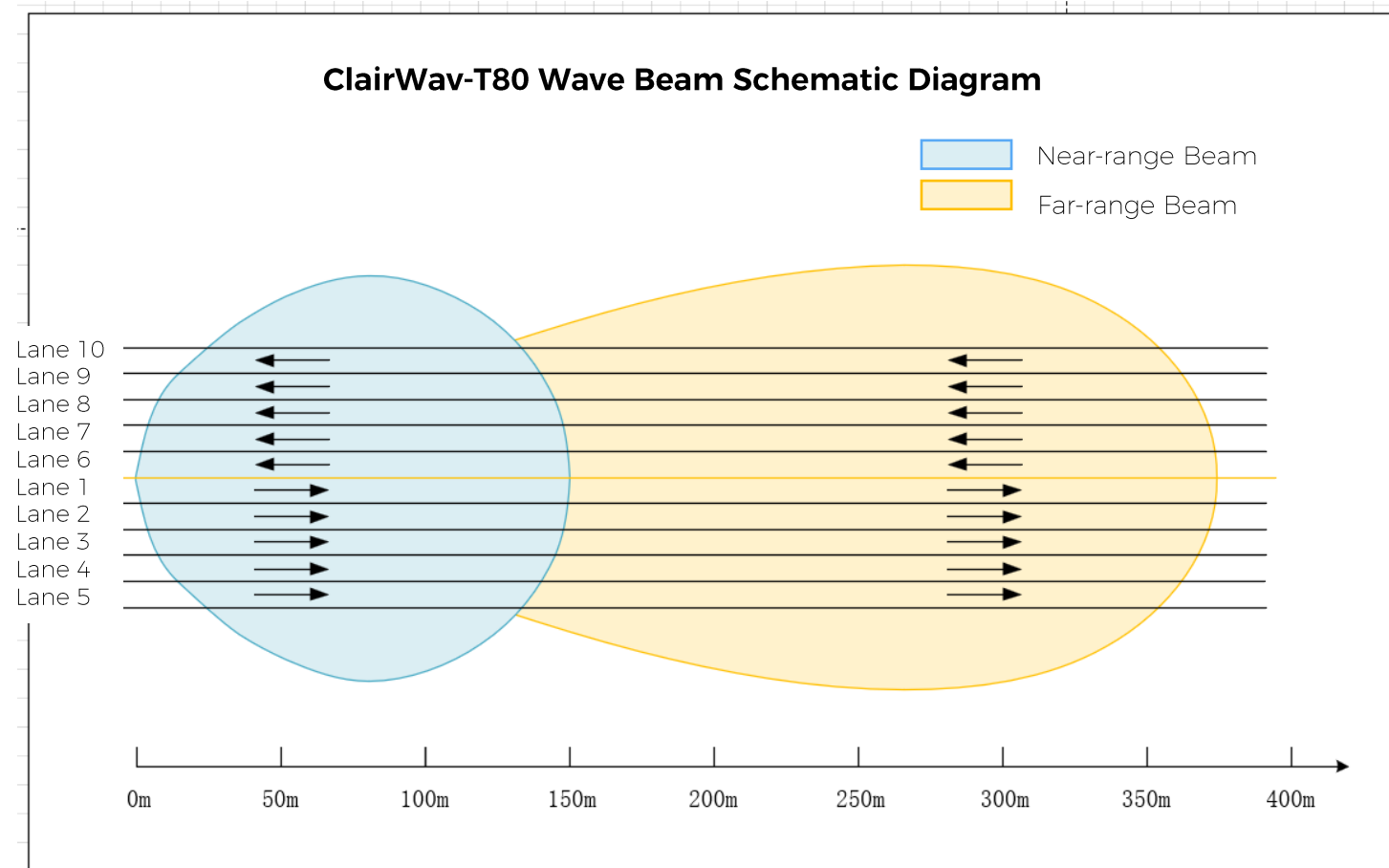
Beam Diagram: ClairWav-T24L/T24LC



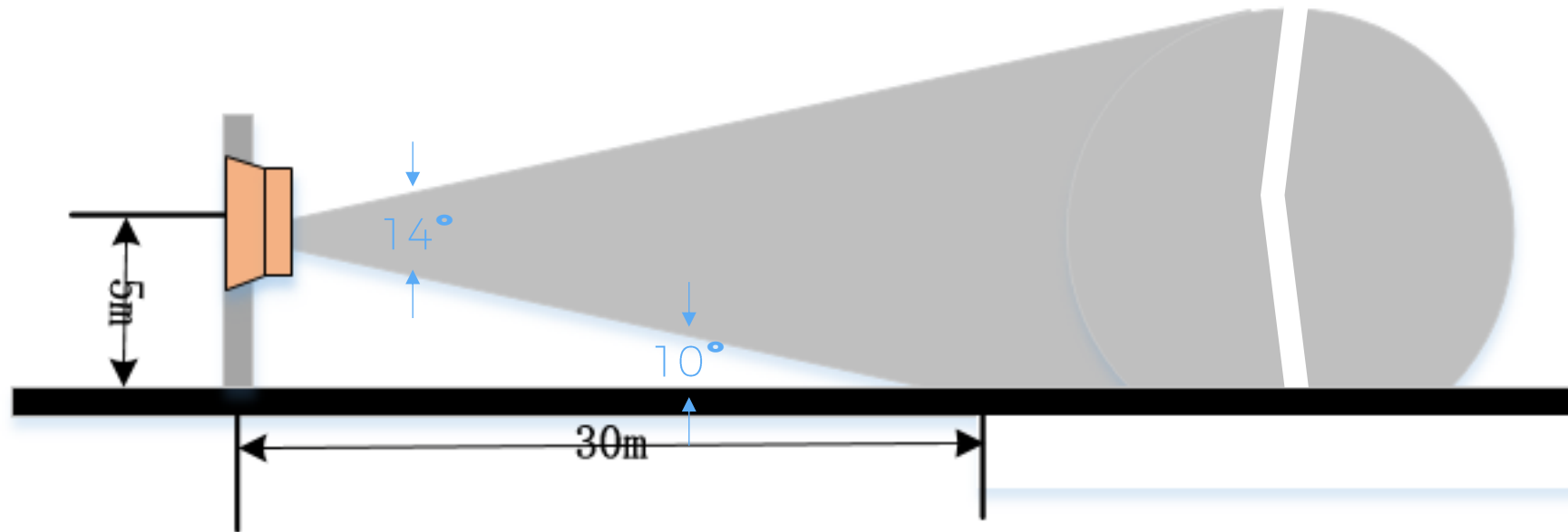
Beam Diagram: ClairWav-T24S/T24SC



Beam Diagram: ClairWav-T80

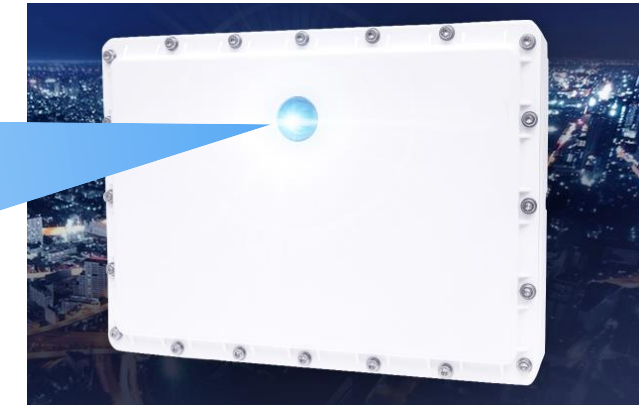


Vertical Beam Diagram



For both T24/T80.

Camera Integrated Radar



- Utilize a 5-megapixel camera for capturing wide scenes
- More intuitive video visualization
- Vehicle characteristic information collection

Advantages of camera integrated Radar

1. Intuitive Display:

Video can show the targets detected by radar in real-time, allowing operators to visually observe the movement and characteristics of the targets.

2. Accurate Identification:

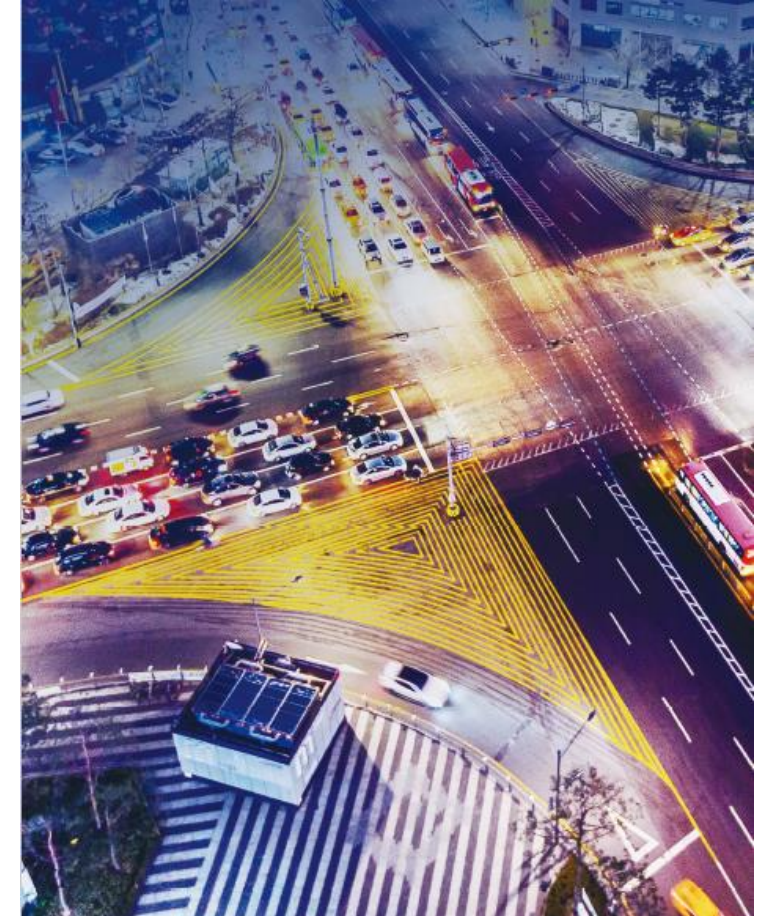
Video can provide more target information, such as shape and color, and when combined with radar detection data, targets can be identified more accurately.

3. Multi-target Tracking:

The multi-target tracking capability of phased array radar, combined with video technology, allows for simultaneous tracking of multiple targets, with each target marked and displayed on the video.

4. Data Fusion:

By integrating radar data with video data, more comprehensive and accurate target information can be obtained, improving the overall performance of the system. With this radar, video can supplement radar's ability to detect stationary targets that might otherwise be missed and increase the accuracy



Camera Specs & Vehicle Classifications

Camera Specs

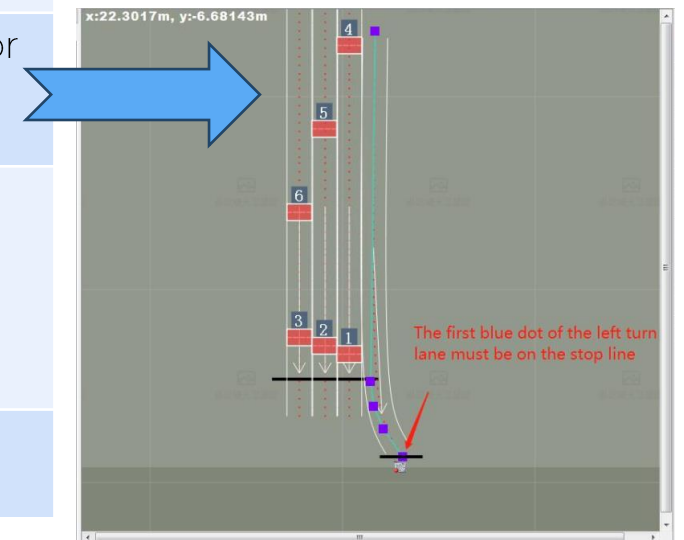
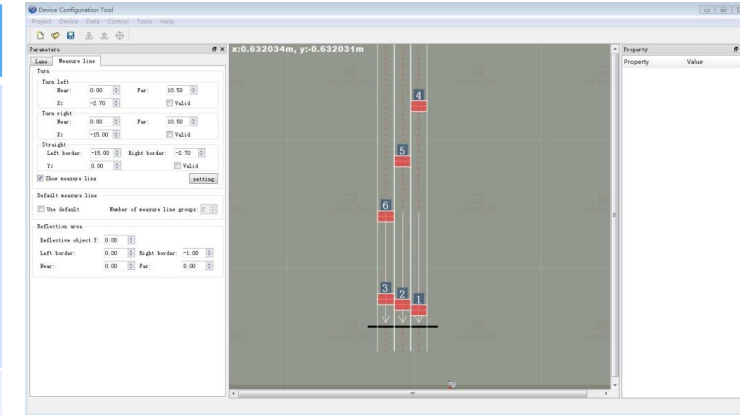
Camera integrated Radar	Supports radar and video coordinate fusion.
Lens	12mm focal length, Field of View (FoV) (DHV) 35°*28°*21°
Minimum illumination	0.01 lx (with frame accumulation enabled, F=1.2, color/black & white)
Resolution	Maximum 2592×1944
Smart encoding	H.265+
Frame rate	(1-25) frames per second, adjustable
Bitrate	90 kbps - 8.8 Mbps, adjustable
ONVIF Protocol	Support
Day/night switching	IR-CUT automatic switching
De-fog	Support
WDR (Wide Dynamic Range)	Support
Digital noise reduction	Support
White balance	Support
OSD	Support

Vehicle Classifications

	Radar	Video integrated Radar
1	Length <5m	Sedan
2	Length between 5-15m	SUV/MPV
3	Length >15m	Bus (public bus, coach)
4		Medium-sized passenger van (e.g., bread van, Coaster)
5		Small truck
6		Medium truck
7		Large truck
8		Construction vehicle
9		Motorcycle (including electric motorcycles)
10		Tricycle
11		Bicycle
12		Pedestrian

Advantages of forward firing compared with side firing

	Advantages of forwarding firing compared with side firing
Field of View	- Focused on long-range detection (250-400m), Suitable for detecting objects or obstacles at a distance directly ahead, such as other vehicles, pedestrians, or road obstructions. - Higher accuracy for the detection of extra long queue. Can follow the vehicle for much longer distance as well.
Multiple Targets	Support up to 256 multiple targets.
Cross Sections (Measuring Lines /Virtual loops)	- Support maximum 64 cross sections (measuring lines or virtual loops) - Support maximum 16 cross sections per each lane
Side Mounting Support	- Usually mounted at the front of the vehicle or system, often integrated into the grille, bumper, or windshield area. - Also support side mounting in highway applications, managing multiple lanes, providing data per each lane.
Vehicle Trajectory	Support vehicle trajectory data which will be important for applications like V2X.



FAQ

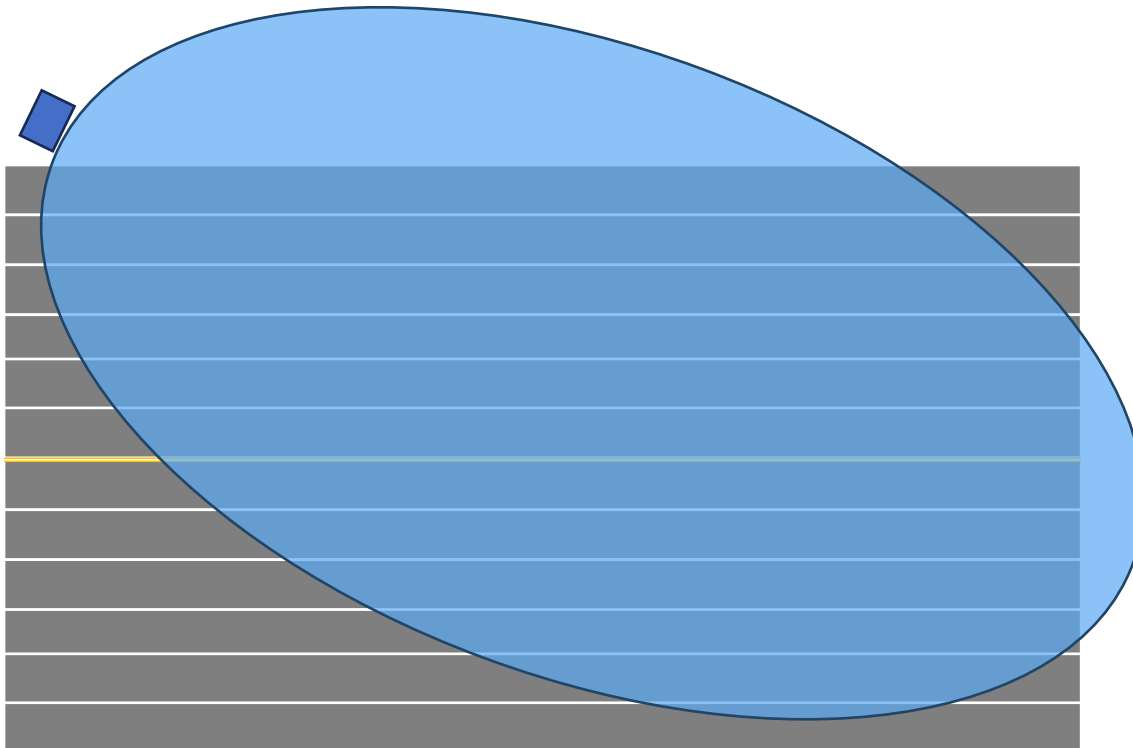
Why do ClairWav radars have high power consumption?

	T24L	T24LC	T24S	T24SC	T80L	T80LC
Power consumption (maximum)	25W	25W	18W	25W	25W	25W
Rated power consumption	20W	20W	11W	20W	20W	20W

ClairWav radars are forward-firing phased array microwave radars with ultra-long detection ranges of 250m to 400m. They support tracking up to 256 targets across 12 lanes and allow the definition of up to 64 cross-sections (such as measuring lines or virtual loops), with a maximum of 16 cross-sections per lane. Additionally, ClairWav radars integrate a video camera, combining the strengths of both radar and camera technologies. This advanced functionality is a key factor contributing to their power consumption.

FAQ

Can forward-firing radar be side mounted on highway application?



ClairWav radars can also be side-mounted to cover multiple lanes, although this configuration may reduce the detection distance along the highway's direction.

FAQ

Internal Data memory capacity ?

- Total 500Mb.
- 24 hours including trajectory data, flow data and all necessary operating data.
- > 90 days if only store flow data.

API

- We provide a standard API (communication protocol) for both sending data and receiving data.
- And we can also support customized API according to customer's request.

ERP (Effective Radiated Power)

- 13dbm

Benchmark-Wavetronix

	WAVETRONIX					TRAFFICLAIR					Notes
Model	Smart Sensor V	Smart Sensor HD	Smart Sensor Matrix	Smart Sensor Advance	Smart Sensor Advance Extended Range	ClairWav-T24S	ClairWav-T24L	ClairWav-T24SC	ClairWav-T24LC	ClairWav-T77	
Type	Cross-Section Microwave - Single Beam	Cross-Section Microwave - Dual Beams	Area Radar - 16 beams (detecting in a 90-degree arc)	Road monitoring radar	Road monitoring radar	Phased array radar					Most of Wavetronix products are cross-section microwave radar, do not support multiple target as phased array radar.
Application scenario	Road segment	Road segment	Intersection	Intersection	Intersection/Highway	Intersection/Highway					ClairWav can be widely used in both intersection and highway scenarios.
Detection distance	61m (200ft)	76m (250ft)	90°; 43m (140ft)	183m (600ft)	Truck: 275m (900ft) Car: 183m (600ft)	250m (820ft)	400m (1312ft)	250m (820ft)	400m (1312ft)	300m (984ft)	ClairWav supports longer distance
Simultaneously Detected Objects	Unknown	Unknown	Unknown	Unknown	Unknown	128	256	128	256	128	ClairWav supports multiple targets simultaneous detection.

Benchmark-Wavetronix

	WAVETRONIX					TRAFFICLAIR					Notes
Model	Smart Sensor V	Smart Sensor HD	Smart Sensor Matrix	Smart Sensor Advance	Smart Sensor Advance Extended Range	ClairWav-T24S	ClairWav-T24L	ClairWav-T24SC	ClairWav-T24LC	ClairWav-T77	
Video Camera	None	None	None	None	None	None	None	5megapixels	5megapixels	None	ClairWav models can support video camera integrates, which benefits much easier management.
Lanes	8 lanes	22 lanes	Multi-lane (support for curved, inclined lanes)			12 lanes (support for curved, inclined, tidal lanes, etc.)				8 lanes	
Data	Traffic volume, speed, occupancy rate.	Traffic volume, speed, occupancy rate, length, vehicle type classification.		Queue length, traffic volume, speed, occupancy rate, length, vehicle type classification, trajectory coordinates.		Traffic volume, average speed, vehicle types, occupancy rate, headway, queue length, saturation level, space occupancy rate, time occupancy rate, 85% percentile speed, maximum queue length, parking occurrences, delay time, latitude and longitude coordinates, target heading angle, instantaneous speed (velocity, acceleration) of the target, two-dimensional coordinates of the target, the lane in which the target is located, and target attributes such as length, width, height, type, and ID number.				Traffic flow, real-time speed/average speed, presence, and queue length	ClairWav supports rich detection data.

Benchmark-Wavetronix

Model	WAVETRONIX					TRAFFICLAIR					Notes
	Smart Sensor V	Smart Sensor HD	Smart Sensor Matrix	Smart Sensor Advance	Smart Sensor Advance Extended Range	ClairWav-T24S	ClairWav-T24L	ClairWav-T24SC	ClairWav-T24LC	ClairWav-T77	
Events	None	Lane changing	Lane changing, illegal parking, etc.	Lane changing, illegal parking, wrong-way driving, etc.	Lane changing, illegal parking, wrong-way driving, etc.	Abnormal parking, wrong-way driving, lane changing, congestion, slow-moving traffic, over speeding, and under speeding. It is equipped to detect and alert authorities about instances such as queue limit exceeded and queue overflow				None	ClairWav supports rich events detection as well.
Installation and debugging	Convenient and remote					Convenient and remote					
Storage	Flash memory storage (upgradeable)					TF storage (upgradeable)				Flash memory storage	
Reliability	Not affected by temperature, light, and weather changes.					Not affected by temperature, light, and weather changes.					
Time synchronization	None	None	None	None	None	Supports GPS (BeiDou/GNSS) hardware time synchronization, capable of providing absolute timestamps with millisecond-level accuracy; supports NTP/PTP clock synchronization with millisecond-level precision.				None but expandable	ClairWav supports time synchronization through GPS/GNSS/Beidou.

Benchmark-SmartMicro

Longer distance

Higher speed resolution

Higher speed detection accuracy

Higher angular measurement accuracy

	SmartMicro									TraffiClair			
	TRUGRD UMRR-12 Type 48 (Typical Values at 12.7dBm)	TRUGRD UMRR-12 Type 48 (Typical Values at 20dBm)	UMRR-11 Type 132 MSE (Long-Range Mode)	UMRR-11 Type 132 MSE (Medium-Range Mode)	UMRR-11 Type 45 (Typical Values at 12.7dBm)	UMRR-11 Type 45 (Typical Values at 20dBm)	TOPGRD (X-Long-Range Mode)	TOPGRD (X-Medium-Range Mode)	TOPGRD (Short-Range Mode)	ClairWav- T24S	ClairWav- T24L	ClairWav- T24SC	ClairWav- T24LC
Operating Frequency	24~24.25GHz	24~24.25GHz	76~77GHz 4 center frequencies (bands)	76~77GHz 2 center frequencies (bands)	24~24.25GHz	24~24.25GHz	76~77 GHz or 79~80 GHz 4 center frequencies	76~77 GHz or 79~80 GHz 2 center frequencies	76~77 GHz or 79~80 GHz 1 center frequencies	24~24.25GHz	24~24.25GHz	24~24.25GHz	24~24.25GHz
Lanes	12	12	6	6	4	4	10	10	10	12	12	12	12
Simultaneously Detected Objects	256	256	256	256	126	126	/	/	/	128	256	128	256
The horizontal field of view angle.	±55°	±55°	±16°	±55°	±22°	±22°	-50~+50°	-50~+50°	-50~+50°	45°	45°	45°	45°
The vertical field of view angle	±10°	±10°	±7.5°	±7.5°	±12°	±12°	-10~+10°	-10~+10°	-10~+10°	7°	7°	7°	7°
Maximum detection range for motor vehicles	Passenger car: 200m Truck: 300m	Passenger car: 260m Truck: 300m	175m	64m	190m	219m	240m	100m	40m	250m	400m	250m	400m
Distance resolution	2m or 4m	2m or 4m	1.8m	0.66m	2.06m	2.06m	2.4m	1m	0.4m	Long distance: 2m Short distance: 0.6m	Long distance: 2m Short distance: 0.6m	Long distance: 2m Short distance: 0.6m	Long distance: 2m Short distance: 0.6m
Distance detection accuracy	±0.25 or ±0.5m	±0.25 or ±0.5m	0.5m	0.25m	±0.25m	±0.25m	0.6m	0.25m	0.1m	Long distance: ±0.4m Short distance: ±0.1m	Long distance: ±0.4m Short distance: ±0.1m	Long distance: ±0.4m Short distance: ±0.1m	Long distance: ±0.4m Short distance: ±0.1m
Speed detection range	±210km/h or ±320km/h	±210km/h or ±320km/h	±300km/h	±255km/h	±320km/h	±320km/h	±320km/h	±320km/h	±385km/h	- 220~+220km/ h	- 220~+220km/ h	- 220~+220km/ h	- 220~+220km/ h
Speed resolution	0.23m/s or 0.78m/s	0.23m/s or 0.78m/s	0.26m/s	0.26m/s	0.35m/s	0.35m/s	0.26 m/s	0.26 m/s	0.46 m/s	0.1m/s	0.1m/s	0.1m/s	0.1m/s
Speed detection accuracy	±0.1m/s or ±0.28m/s	±0.1m/s or ±0.28m/s	0.1m/s	0.1m/s	±0.18m/s	±0.18m/s	0.07 m/s	0.07 m/s	0.14 m/s	±0.05m/s	±0.05m/s	±0.05m/s	±0.05m/s
Angular resolution	6°	6°	4°	15°	1°	1°	2°	2°	2°	3°	2°	3°	2°
Angular measurement accuracy	0.5°	0.5°	0.5°	0.5°	20°	20°	0.25° (Azimuth angle) 0.5° (Pitch angle)	0.25° (Azimuth angle) 0.5° (Pitch angle)	0.25° (Azimuth angle) 0.5° (Pitch angle)	±0.2°	±0.1°	±0.05°	±0.05°
Operating/storage temperature	-40°C~+80°C	-40°C~+80°C	-40°C~+85°C	-40°C~+85°C	-40°C~+85°C	-40°C~+85°C	-40°C~+85°C	-40°C~+85°C	-40°C~+85°C	-40°C~+70°C (Operating temperature) -45°C~+85°C (Storage temperature)	-40°C~+70°C (Operating temperature) -45°C~+85°C (Storage temperature)	-40°C~+70°C (Operating temperature) -45°C~+85°C (Storage temperature)	-40°C~+70°C (Operating temperature) -45°C~+85°C (Storage temperature)
IP Class	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67

Benchmark-RTMS ECHO

Model Name	RTMS ECHO	ClairWav-T24	ClairWav-T80	Notes
Type	The RTMS Echo is a side fire radar mounted on the roadside. K band, model Echo operates at high resolution in the 24 GHz band	24GHz Phased array traffic radar	80GHz Phased array traffic radar	Forward installation (also support side mounting), managing multiple lanes, providing data per each lane.
Application	Urban Road/Highway	Urban Road/Highway	Urban Road/Highway	
Detection Distance	76m	250-400m	350m	Much longer distance. Higher accuracy for the detection of extra long queue. Can follow the vehicle for much longer distance as well.
Detection Targets	Do not support multiple targets	256	256	Multiple targets
The horizontal field of view angle	78°	90°	90°	Wide angle
Maximum cross section count	Should be 1 only	64	64	Support maximum 64 cross-section count, this is the big advantage of forward installed radar compared with side fire radar.
Maximum cross section count per lane	Should be 1 only	16	16	Each lane can support max 16 cross-section count.
Vehicle Trajectory	Do not support.	Support	Support	Vehicle trajectory data will be important for applications like V2X
Data	Volume and Occupancy · Classification counts · Gap and Headway · Vehicle speed bins (8) · Average speed · 85th percentile speed · Per-vehicle records · Sensor voltage · Length-based classification bins (8)	Traffic flow, average speed, vehicle type, occupancy rate, headway, queue length, saturation, space occupancy rate, time occupancy rate, 85th percentile speed, maximum queue length, number of stops, delay time, latitude and longitude coordinates, target heading angle, target instantaneous velocity (speed, acceleration), target two-dimensional coordinates, target lane, target attributes (length, width, height, type, ID number).	Traffic flow, average speed, vehicle type, occupancy rate, headway, queue length, saturation, space occupancy rate, time occupancy rate, 85th percentile speed, maximum queue length, number of stops, delay time, latitude and longitude coordinates, target heading angle, target instantaneous velocity (speed, acceleration), target two-dimensional coordinates, target lane, target attributes (length, width, height, type, ID number).	Rich data
Pedestrian, non-motor vehicle	Support	Support	Support	
Operating Temperature	- 40°C ~ +74°C	- 40°C ~ +70°C	- 40°C ~ +70°C	
IP Class	IP67	IP67	IP67	
Dimension	320 x 180 x 70 mm	210*154*58mm	210*154*58mm	Small size
Weight	1.5Kg	2Kg	2Kg	
Power Supply	12-24 Volts DC	DC24V(DC+21.6V ~ 32V)	DC24V(DC+21.6V ~ 32V)	
Operating Frequency	24.5-24.25 GHz (K band)	24-24.25 GHz (K band)	80GHz	Multiple choices
Interface	Ethernet 100Mbps	Ethernet (RJ45 100Mbps)	Ethernet (RJ45 100Mbps)	
MTBF	10 years	10 years	10 years	
Installation	Easy	Easy	Easy	

Benchmark-Econolite

Model Name	EVO RADAR	ClairWav-T24	ClairWav-T80	Notes
Type	MIMO (Multiple Input Multiple Output) regional radar system, similar to regional security radar, can simultaneously cover two directions, requiring only two installations per intersection. However will need to install dedicated poles and the accuracy will be affected by trees and so on.	24GHz Phased array traffic radar	80GHz Phased array traffic radar	Forward installation, managing multiple lanes, providing data per each lane. Do not need to install dedicated pole.
Application	Intersection	Intersection/highway	Intersection/highway	Wide application scenarios
Detection Distance	274m (900feet)	250-400m	350m	Longer distance
Detection Targets	512	256	256	
The horizontal field of view angle	110°	90°	90°	Small angel but longer view
Data	Flow, speed, type, arrival time	Traffic flow, average speed, vehicle type, occupancy rate, headway, queue length, saturation, space occupancy rate, time occupancy rate, 85th percentile speed, maximum queue length, number of stops, delay time, latitude and longitude coordinates, target heading angle, target instantaneous velocity (speed, acceleration), target two-dimensional coordinates, target lane, target attributes (length, width, height, type, ID number).	Traffic flow, average speed, vehicle type, occupancy rate, headway, queue length, saturation, space occupancy rate, time occupancy rate, 85th percentile speed, maximum queue length, number of stops, delay time, latitude and longitude coordinates, target heading angle, target instantaneous velocity (speed, acceleration), target two-dimensional coordinates, target lane, target attributes (length, width, height, type, ID number).	Rich data
Pedestrian, non-motor vehicle	Support	Support	Support	
Operating Temperature	- 40°C ~ +74°C	- 40°C ~ +70°C	- 40°C ~ +70°C	
IP Class	IP67	IP67	IP67	
Dimension	308*136*71 mm	210*154*58mm	210*154*58mm	Small size
Weight	2.5Kg (5.5 lbs)	2Kg	2Kg	
Power Supply	20-28 VDC 36 W @ 20°C	DC24V(DC+21.6V ~ 32V)	DC24V(DC+21.6V ~ 32V)	
Operating Frequency	24.5-24.25 GHz (K band)	24-24.25 GHz (K band)	80GHz	Multiple choices
Interface	Ethernet 100Mbps	Ethernet (RJ45 100Mbps)	Ethernet (RJ45 100Mbps)	
Lifespan	3-year	10-year	10-year	Longer lifespan
Installation	Easy	Easy	Easy	

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