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SMART MICROWAVE SENSORS

Hybrid AI Tracking

Radar-Centric – Camera-Enhanced – AI-Powered

Hybrid AI Tracking is the next evolution in traffic detection, combining advanced radar with high-definition video into an AI-powered system. Designed for signalized intersections, highways, and other complex traffic scenarios, it ensures premium detection, precise object classification, and continuous, reliable performance in all weather and lighting conditions.

By merging radar's long-range precision with high-definition video, Hybrid AI Tracking delivers outstanding accuracy, situational awareness, and operational efficiency, helping cities and traffic operators optimize traffic flow, improve safety, and support traffic enforcement.

Where to use?

Intersection Management | Smart Cities | VRU Protection | Highway Management | Enforcement

Key Features

Advanced AI Radar–Video Fusion
Radar point clouds and visual streams are processed and fused via the COM HUB Hybrid interface, ensuring seamless tracking and highly reliable object detection across multiple lanes and multiple approaches.

Consolidated Object Lists
A unified object list is obtained by merging radar and visual detections into a single AI-tracked model, enabling precise traffic monitoring and decision-making.

Satellite Imagery–Based Configuration and Validation
Detection zones are easily set up with the Traffic Web UI via satellite imagery, with camera overlays for visual verification, enabling rapid, accurate and simplified configuration and commissioning.

Embedded Video Streaming
Live video access allows remote traffic monitoring, system checks, performance validation, and troubleshooting without additional infrastructure.

Advanced Classification & VRU Protection
Highly accurate classification of all road users, including vulnerable road users (VRUs) such as pedestrians and cyclists, enabling safer intersections, better traffic management, and reliable analytics, even in complex multi-lane environments.

CONCLUSIONS

AI-Powered Radar & Visual Detection

Hybrid AI Tracking **intelligently combines radar** and **visual detection** using advanced **AI-based algorithms**.

Why choose Hybrid AI Tracking?

AI-powered Hybrid Sensor Fusion
Radar and visual data streams are combined and processed through the COM HUB Hybrid interface, creating a fully integrated system for unparalleled detection accuracy.

Premium Stop Bar Detection and Classification Accuracy
Visual detection enhances stop bar presence detection and classification.

Scalable Multi-Sensor Architecture
Multiple sensors can be connected to a single COM HUB Hybrid to set up a whole intersection coverage.

Long-Range Performance
Hybrid AI Tracking can track objects at distances of up to 300 meters (985ft), providing precise information on their position, speed and class in real time.

Seamless Tracking
Seamless accurate object tracking throughout the entire intersection, including turning vehicles.

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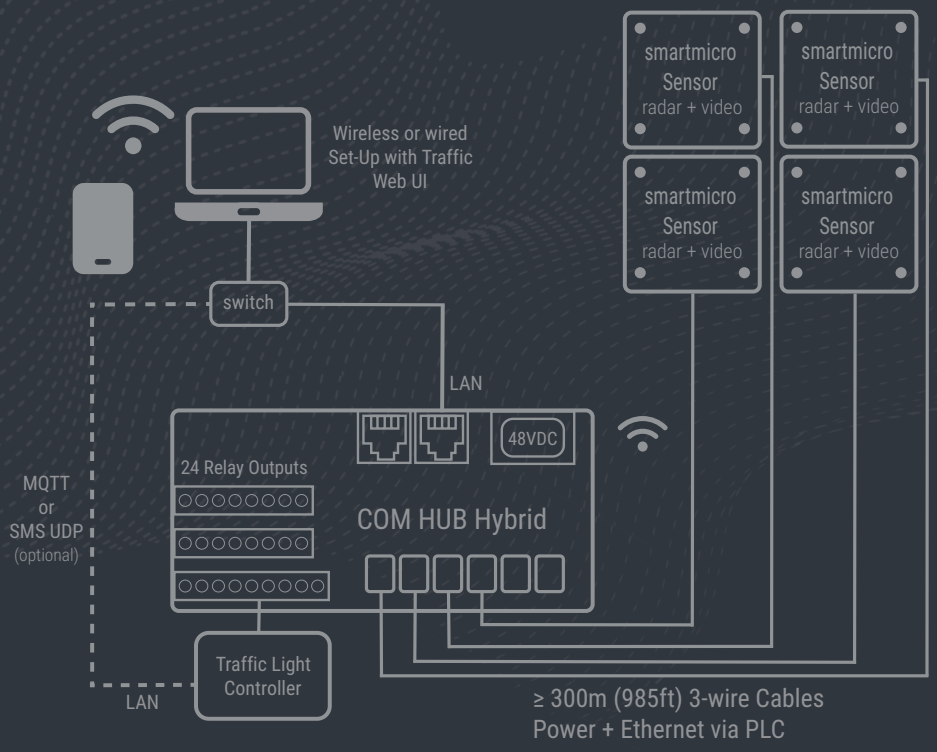
Hybrid AI Tracking System Architecture

Hybrid AI Tracking runs on selected smartmicro sensor and interface platforms. The current implementation combines TRUGRD Stream sensors with the COM HUB Hybrid, forming a fully integrated radar-video fusion system.

- Each sensor integrates radar and high-definition video, providing radar point clouds and visual streams.
- Advanced AI-based algorithms perform seamless radar-video fusion and generate a consolidated object list.
- Supports traffic control, enforcement, V2X and scalable deployments for complex traffic scenarios.



Platform Overview

	TRUGRD Stream
Radar Technology	3D-UHD radar
	Detection range: 20 m - 300 m | 65 ft - 985ft
	Speed range: -320 … +320 km/h -200 … +200 mph
	Multi-lane coverage
Camera Module	Full HD (1920 × 1080 px), up to 30 fps
Detection	Stop bar detection & advanced detection
	Object classification (9 classes incl. VRUs)

	COM HUB Hybrid
Fusion Processing	Super Resolution AI Tracking
	Seamless radar & visual fusion
	Consolidated object list generation
Connectivity	Up to 4 TRUGRD Stream sensors
	Power + Ethernet via PLC
Outputs & Integration	Up to 24 relay outputs (expandable)
	MQTT support
	RS485
	Onboard Traffic WEB UI
Deployment	DIN-rail mountable
	24VDC / 48VDC

Optional for Integration with US Controllers

	SDLC Module
System Integration	Providing output states to the traffic light controller via SDLC protocol, supports both TS/2 (BIU) and ATC (SIU)

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