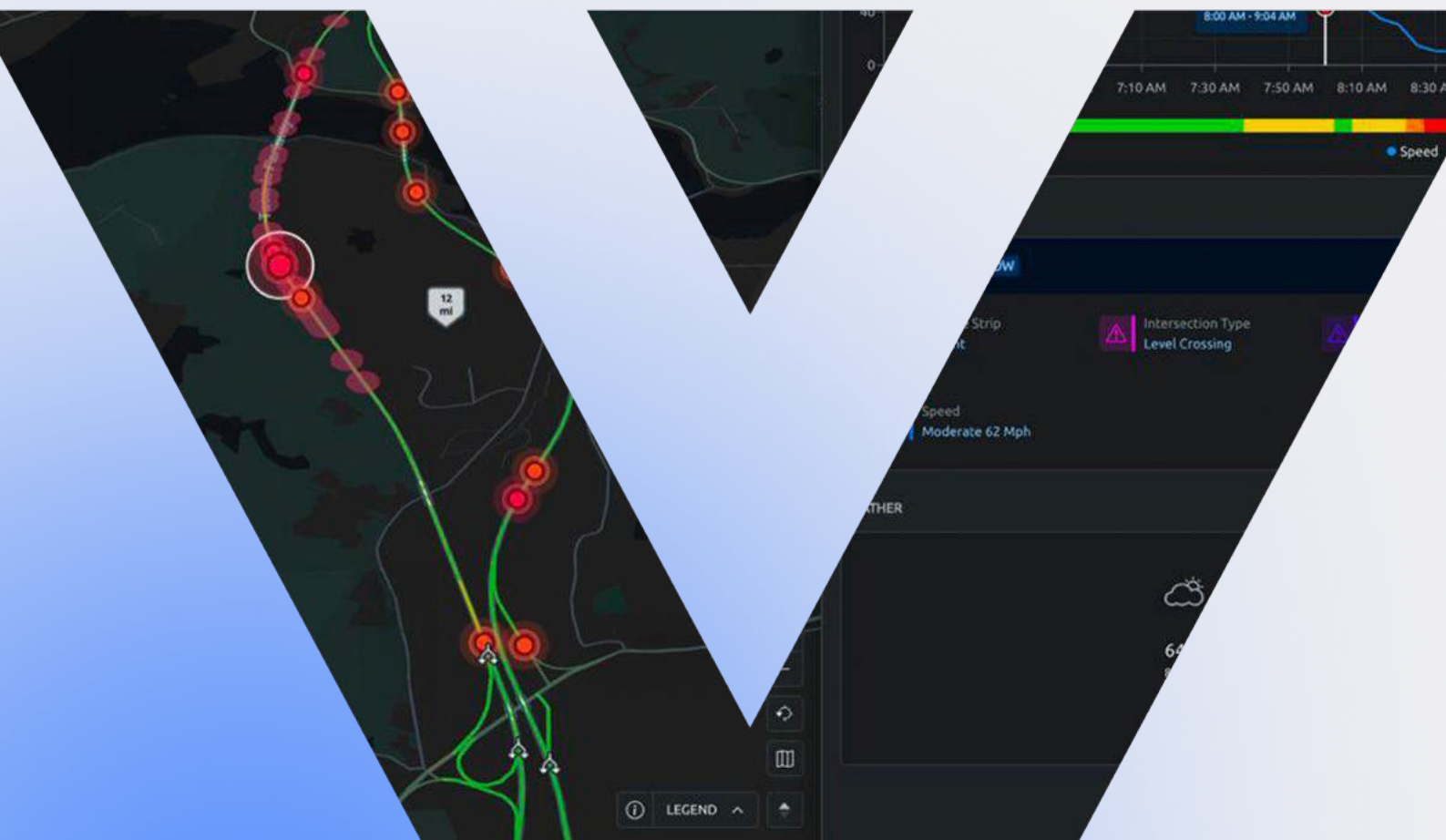
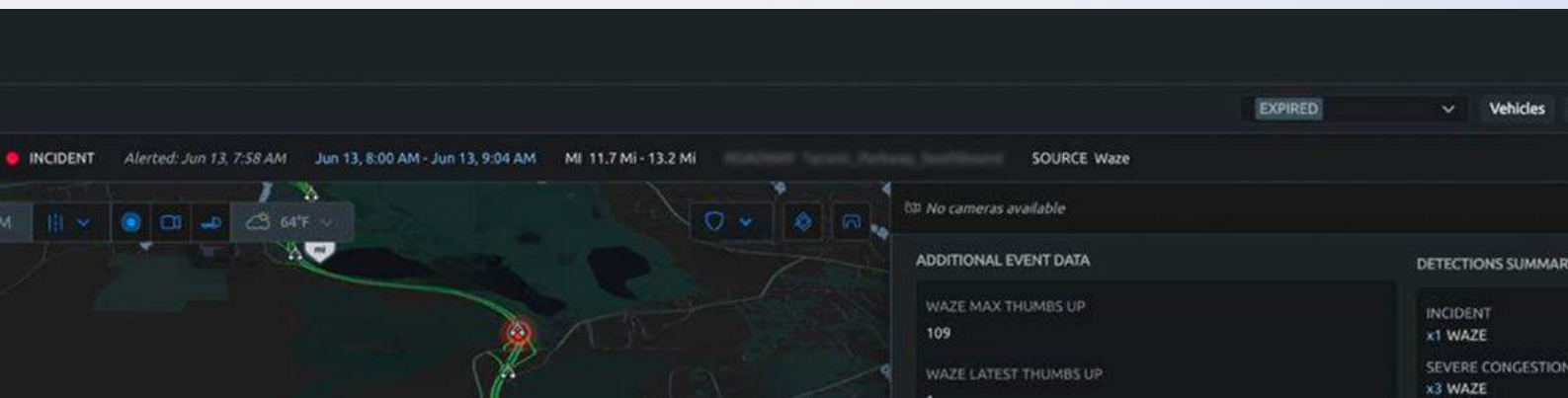


VALERANN

TECHNICAL SPECIFICATION





DATA INTEGRATION

GIS Road/Network Model	Real-time GIS framework with static and dynamic layers representing lanes, shoulders, and fixed assets. Includes configurable satellite data layer as standard. All detections and events mapped to WGS-84 coordinates and linear referencing system (chainage), configured using open source or client-supplied milemarker and chainage data.
Floating Car Data (FCD)	Integration with Waze, HERE, Google, INRIX, and Mapbox for live speed, congestion, and incident data. Optional TomTom and/ or Google RMI integrations available.
Historical Event Data	Import and integration of crash/incident archives for model tuning and historical risk calibration.
Weather Data	Realtime, historic and forecast weather data from Tomorrow.io, Accuweather, and/or client weather station integrations.
Web Cloud / UI Interface	Cloud-native deployment accessible via browser-based dashboard with unified access to detections, events, cameras, analytics, and reports. Cloud-agnostic. Typically tenanted according to client geography and requirements.
Patrol & Fleet GPS Data	Compatible with GeoTab, Webfleet, and 10+ other providers for live patrol and asset tracking.
ITS Device Integrations	Ingests radar, loops, counters, weather stations, and DMS/VMS devices; supports bi-directional API integration (NTCIP/TMDD).

CCTV INTEGRATION AND COMPUTER VISION AI

Camera Integration	Supports AXIS, Bosch, Dahua, Cohu, Pelco, FLIR, and all ONVIF-compliant models. Integrates direct-to-device or via Milestone, Genetec, Avigilon.
Video Management	In-browser virtual video wall for multi-stream viewing; no plugin required. Integration of pre-installed live CCTV streams (static & PTZ) direct to device or via a Video Management System. Live stream from each camera 24/7.
Video Storage & Retention	Continuous stream storage up to 3–14 days depending on the package. Event clip retention up to 30–365 days.
AI Detection (CV AID)	Real-time detection of stopped vehicles, hazard lights, static hazards. Supports static and PTZ cameras. Device-agnostic and compatible with a wide range of resolutions, framerates and bitrates. Proprietary panoramic masking capabilities enable simultaneous CV AID and PTZ controls.
Dynamic Masking & Geolocation	Automatic calibration (<2 min) after PTZ movement. Object localization on carriageway, shoulder, or off-road.

EVENT DETECTION: DATA FUSION, INSIGHTS & ALERTS

Data Fusion Engine	Multi-layered fusion of detections, traffic, weather, and contextual data. Reduces raw data volume generating concise, actionable insights.
Real-time Event Detection	Automated detection and alerting for crashes, stopped vehicles, road debris, road hazards, and obstructions. Configurable severity/ confidence scoring.
Alert Configuration	User-level visual/audio alerts; tuning at setup and quarterly thereafter (monthly or weekly for advanced tiers).
Traffic Flow & Speed	Aggregated data at 100 m resolution across the corridor. Fused from FCD + sensors. Traffic Fusion Engine analyses incoming traffic data from all available internal and 3P sources to produce aggregated fused traffic data for state and speed estimation, congestion and anomaly detection with maximum accuracy and minimum latency.
Atypical Traffic Detection	Identifies deviations from expected traffic behavior (such as lane obstruction, queue formation, abnormal speeds) using historical models and real-time data fusion. Enables high-accuracy corroboration of reports against traffic flow disruptions, assisting with incident identifications, especially in areas with restricted CCTV coverage.
Risk Profiling	Historical crash data cross-correlated with live conditions to identify elevated-risk segments, based on ingested data and expert risk rules modeling.
Weather Context	Real-time and forecast weather metrics with GIS overlays as provided by applicable integrations.
Patrol / Fleet & ITS Monitoring	Displays status and telemetry from CCTV, radar, VMS, and weather stations.

EVENT VALIDATION & PLANNING

Contextual Tools	Access traffic analysis, disruption graphs, and detection metadata.
Event Fusion Traceability	Full record of contributing detections per event for validation transparency and auditability.
Nearby Asset Identification	Map-based proximity search for cameras, VMS, and patrols.
CCTV Validation	Immediate access to live or replay feeds around events with annotations.
Video Replay	Downloadable clips up to 1 hour before and after the logged event.

DATA WAREHOUSING & REPORTING

Event Archive	Fully searchable event database by type, date, location, and validation outcome.
Dashboards	Built-in analytics for detection rates, event validity, operator performance, and SLA KPIs.
Custom Reports	Bespoke dashboards available on request along with analytical consultancy.

USER INTERFACE & MANAGEMENT

Web Application	Highly-available responsive interface with modular panels and low-bandwidth fallback mode.
User Management	Centralized global and per-user preference management; role-based access control. Optional SSO integration.
Localization	Full support for regional time zones, measurement units, and languages.
Filtering & Segmentation	Advanced filters for events, event archive, and region-based segmentation as well as monitoring regions.

EVENT LOGGING & ADMINISTRATION

Event Logging	Manual or automatic logging; configurable Type, Location, Time, Severity, etc.
Editing & Ownership	User-assigned read/write credentials with assignable event ownership and accountability.
Evaluation & Status Tracking	Record validity, state, resolution and outcomes with full traceability and auditability.
Exports	PDF and CSV export of individual or grouped event reports.
External ATMS Publication	Publish verified events to client ATMS or incident systems via API, including GIS and metadata.

INFORMATION SHARING

Information Sharing	Publish events via Waze, X/Twitter, Slack, TEAMS, or DATEX II feeds. RSU/V2X broadcast optional.
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RESOURCE MANAGEMENT & COORDINATION

Patrol Application	Mobile Progressive Web App (PWA) for iOS/Android. Supports tasking, arrival/clearance logging, and photo upload.
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DEVICE MANAGEMENT & CONTROL

VMS/DMS Integration (optional at additional cost)	NTCIP-compliant interface with live preview, message templates, and scheduling.
Lane Control Signs (LCS) (optional at additional cost)	Control lane status and variable speed limits via NTCIP (optional add-on).
Device Libraries	Central repository of approved message terms and multi-page configurations.
Automation	Define message priorities and auto-triggers based on event type.

SYSTEM ARCHITECTURE & PERFORMANCE

Hosting Model	Cloud-native SaaS (AWS default).
Performance Benchmarks	Typical maximum end to end latency <10 s.
Data Privacy	Configurable retention 7-180 days; anonymization and FOIA-compliant exports.
Maintenance & Support	24/7 monitoring, Customer Success liaison, SLAs subject to triage and response times per contract.
Scalability	Modular and horizontally scalable; deployable from pilot to statewide.
Auditable Event Triage & Review Storage	All event creation, validation, and closure actions are recorded with timestamped operator IDs and video references, ensuring full audit traceability.
Model Resilience	Models trained for low-light, snow, and adverse weather operation.
Security	AES-256 encryption in transit and at rest; TLS 1.3; GDPR/UKGDPR-compliant; hosted on ISO 27001, 27017-certified AWS infrastructure with least-privilege network segmentation. Configurable data retention (7-180 days); CCTV footage typically downsampled to avoid initial ingestion of PII / plate data.

