




THE SMARTEST TRAFFIC MANAGEMENT SOLUTION

Integrating AI with Legacy
Infrastructure: Pioneering the
Future of Traffic Management



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Houston, TX based
Currux Vision LLC Pioneered the First AI-Driven Edge Device for U.S. Traffic Cabinets

Seamlessly integrating with any existing traffic camera, our system delivers exceptionally accurate detection and real-time signal actuation—setting a new standard for modern, intelligent intersections

01

Currux Vision Overview



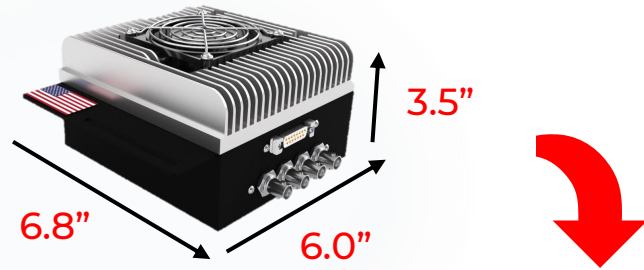
Over speed
Speed: 60mph
Car/NB34CA

Car on crosswalk!
Speed: 60mph
Car/KJ43LAA

Pedestrian

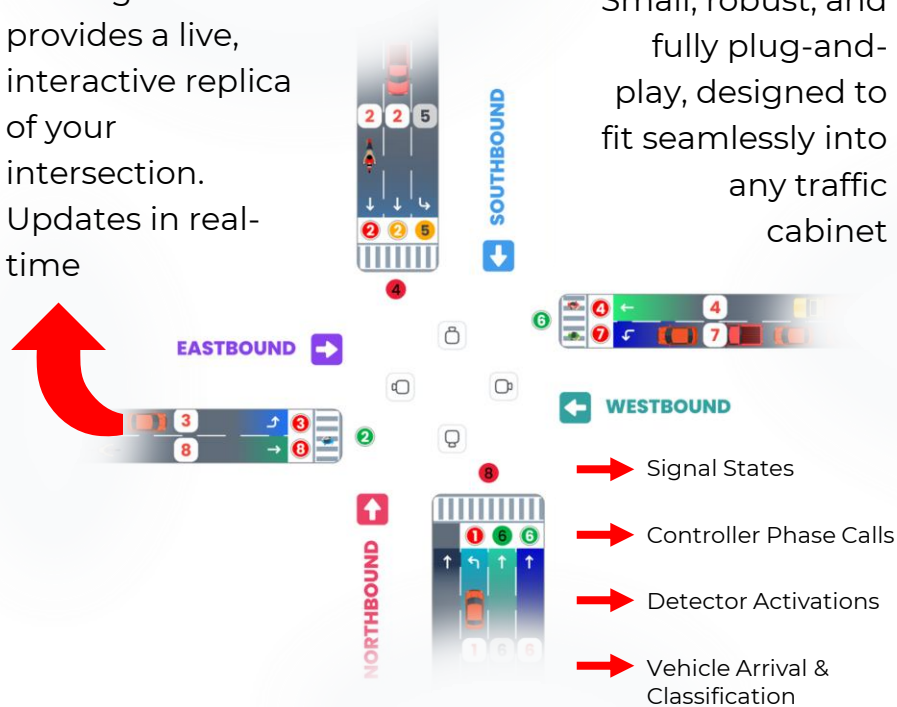
Pedestrian

Currux Vision Overview



Our Digital Twin provides a live, interactive replica of your intersection. Updates in real-time

Small, robust, and fully plug-and-play, designed to fit seamlessly into any traffic cabinet



AI-Powered Detection for Legacy Infrastructure

Currux Vision modernizes outdated traffic systems by layering advanced AI detection onto existing infrastructure—no replacements needed.

Even with older or low-quality cameras, our system delivers high-accuracy detection in low-visibility conditions. This offers a cost-effective solution to upgrade thousands of outdated intersections across the U.S. and Canada without the need for full system overhauls.

Precise Detection

Our #1 priority: Highly accurate detection of vehicles, pedestrians, and bicyclists — paired with real-time signal actuation

Purpose-Built for the ITS Industry

Engineered specifically for traffic cabinet environments and fully complies with NEMA TS2 standards

Full Suite of Analytics for Traffic Engineers

Real-time & historical traffic analytics with video-based incident detection and notifications.

02



Hardware Configuration

Over speed
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Car/NB34CA

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Pedestrian

Pedestrian

Why We Build Our Own Hardware



If you are serious about software, you need to build your own hardware

- Alan Kay

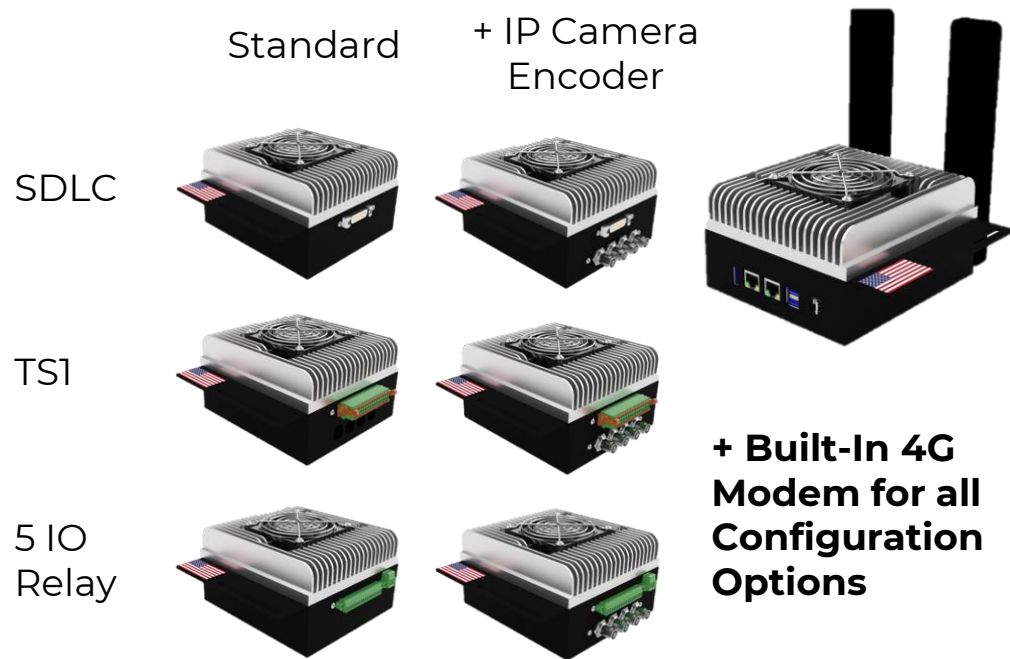
Pioneer of object-oriented programming



01 Designed, Integrated, and Built by Currux Vision in Texas

- Eliminates the need for third-party appliances and reduces integration headaches.
- Purpose-built for Currux Vision’s AI software, using a powerful NVIDIA GPU and ARM CPU—the same chip trusted by Rivian and Toyota for autonomous systems.
- In-house design and manufacturing for rapid innovation and adaptation to customer needs.
- Manufactured in Houston, Texas, with fast turnaround—units are repaired in 1–2 weeks and backed by local warranty coverage.
- Consistent delivery of more powerful hardware versions over time.

Why We Build Our Own Hardware



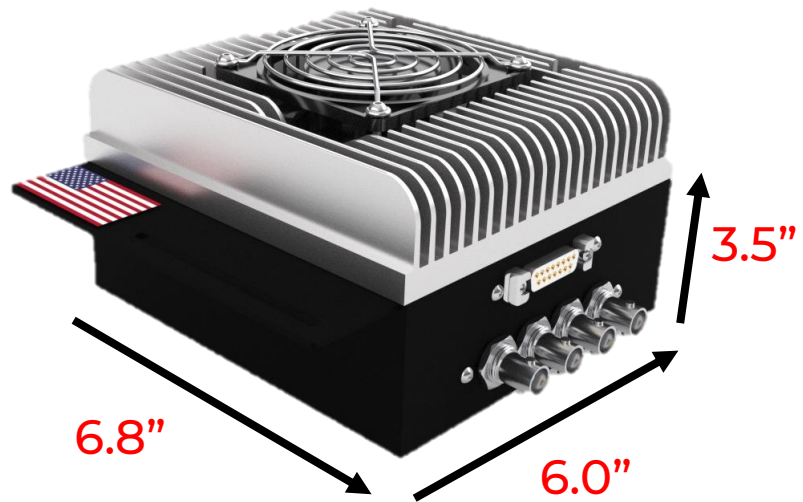
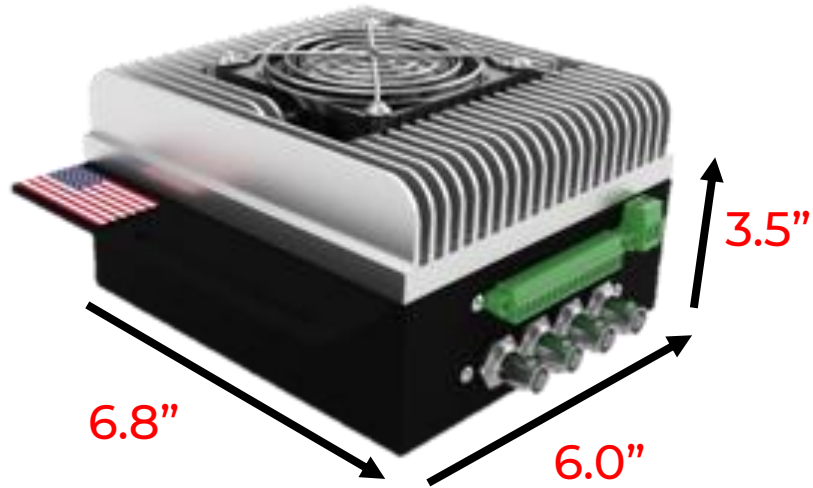
02 Fully Customizable Integration

- Configurations tailored to exact customer needs with native support for SDLC, relays, IP camera encoders, 5 Channel IO Relay and 4G modems.
- Improves quality control and makes troubleshooting easier.

03 Purpose-Built, Certified, Hardened

- Independently certified to NEMA TS2 standards.
- Includes hardened SSD memory up to 256GB
- Plug and Play: requires only power and a network connection.
- Compact form factor for easy deployment.

Why We Build Our Own Hardware



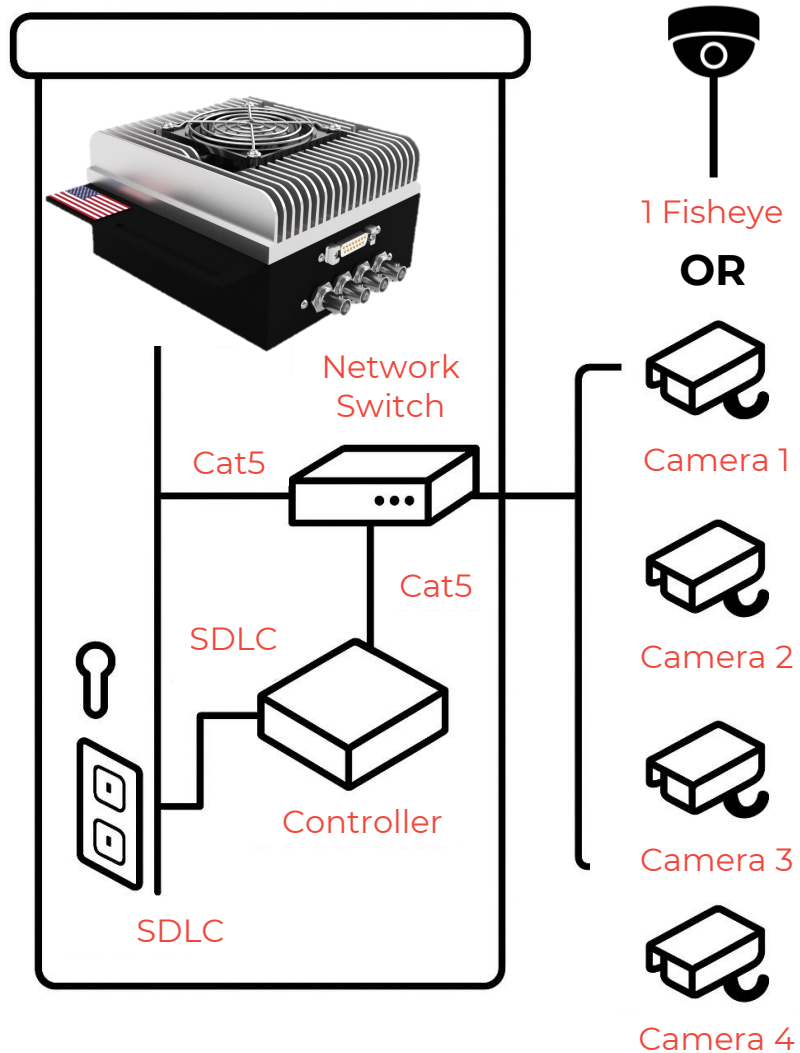
04 New & Existing Camera Integration

- Analog
- Legacy
- IP Cameras (Ethernet)
- Fisheye
- Iteris

05 Edge-Based: Offline Operation with A Closed-Loop System

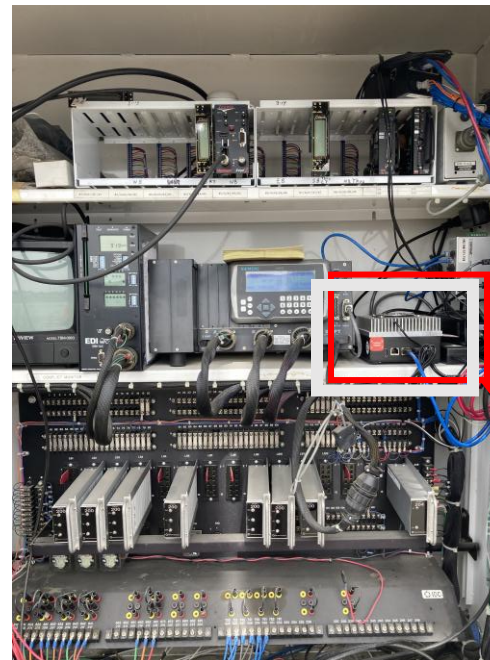
- All data is locally processed and stored on our edge AI server
- No cloud or internet connection is required
- Optional cloud & 4G capabilities

How We Are Setup in the Traffic Cabinet



Cabinet Integration

- Integrates seamlessly with IP cameras and the traffic controller via the cabinet's Ethernet switch.
- BNC adaptors for analog cameras
- Triggers phase calls via NTCIP or SDLC based on real-time detections



Purpose-built for the ITS industry, our server integrates seamlessly into even the busiest traffic cabinets



03

Accurate Detection



Over speed
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Car/NB34CA

Car on crosswalk!
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Car/KJ43LAA

Pedestrian

Pedestrian

Industry Leading Detection & Classification Accuracy



Accurate Vehicle, PED, and Bicyclist Classification

- Car
- Light Truck
- Heavy Truck
- Bus
- Motorcycle
- Pedestrian and Bicyclist

Notice the impressive range—our system accurately detects vehicles and pedestrians even at a distance.



Trains, Buses, Light Truck, and Heavy Truck Distinction



Excellent Performance with Legacy Cameras

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Out of the Box Integration with Analog Cameras

- Iteris
- Econolite
- Rhythm
- Peak
- And More.....

Layer Currux Vision's advanced AI to your existing cameras and instantly upgrade legacy, low-quality systems into high-performance detection solutions.



Accurate Detection with Low-Visibility: Heavy Shade



Car: 6
Light Truck: 0
Heavy Truck: 0
Bus: 0
Motorcycle: 0
Bicyclist: 0
Pedestrian: 0

FPS: 21.0
12:03:44PM
07/14/21

Left Turn
Through
sidewalk
Car Lane Out
Out
Car Lane Out
Crosswalk

University Ave @ 20th Terr (G) 03/24/21-13:04:24:400

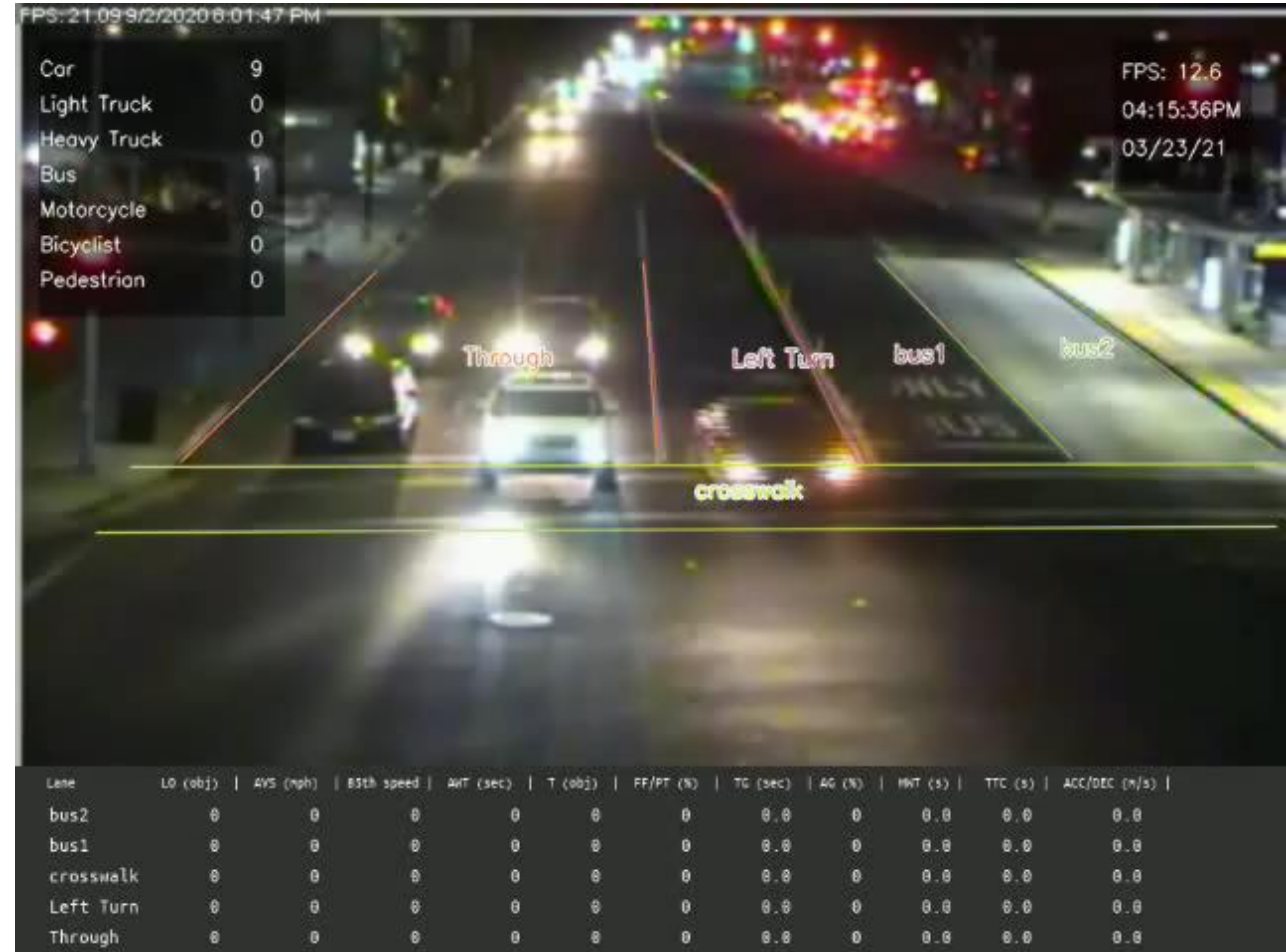
| Lane | LO (obj) | AVS (mph) | BSth speed | AUT (sec) | T (obj) | FF/PT (%) | TC (sec) | AG (%) | HWT (s) | TTC (s) | ACC/DEC (M/s) |
|-----------|----------|-----------|------------|-----------|---------|-----------|----------|--------|---------|---------|---------------|
| sidewalk | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| Crosswalk | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0 | 0.0 | 0.0 | 0.0 |
| Out | 2 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| Through | 2 | 27 | 36 | 0 | 6 | 2 | 1.2 | 100 | 0.0 | 0.0 | 0.0 |
| Left Turn | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |



Low-Visibility Conditions Demand AI-Powered Detection

- Works very well with lower quality cameras with poor image quality
- Gets smarter overtime as more data is collected

Environment-specific AI retraining ensures the model learns from your intersection's unique geometry, traffic patterns, and lighting conditions.



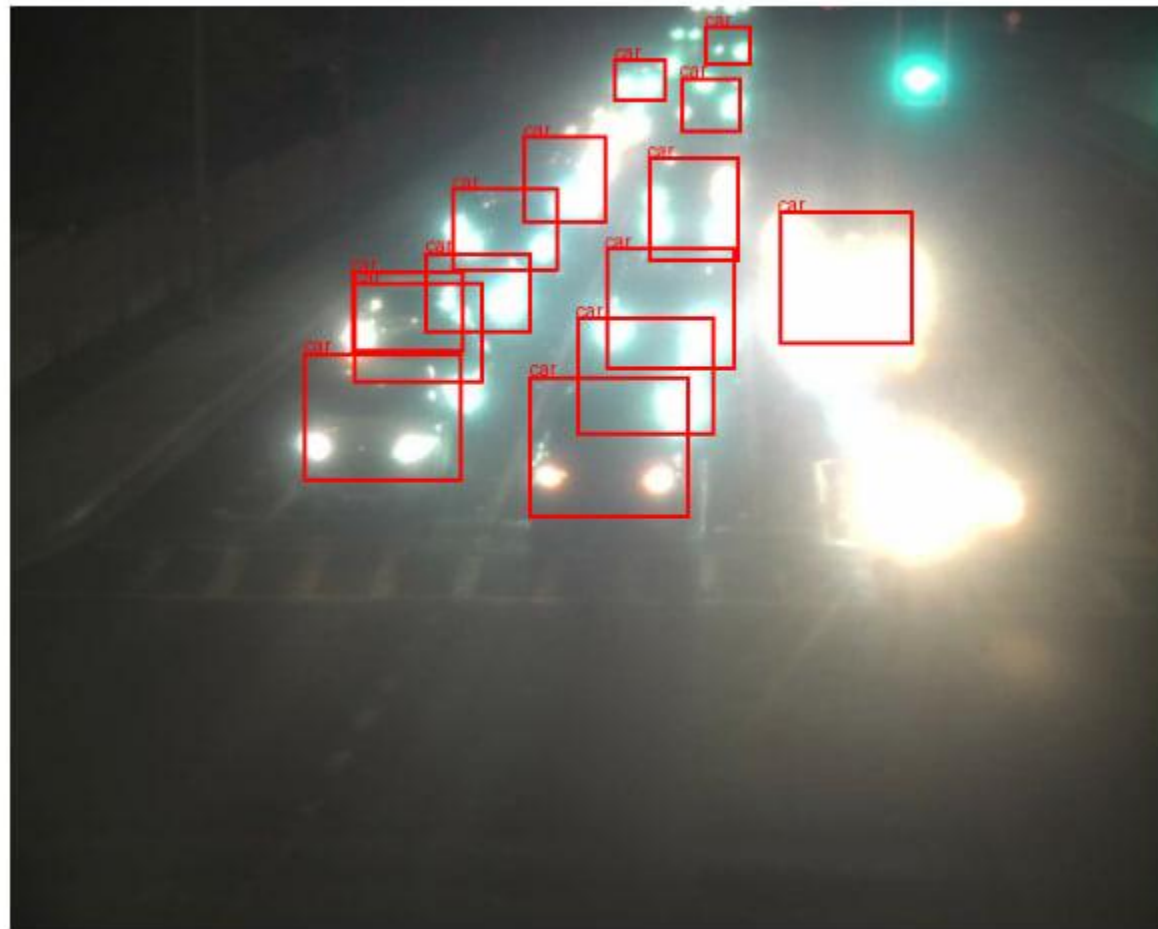
Currux Vision Environment Specific AI-Retraining



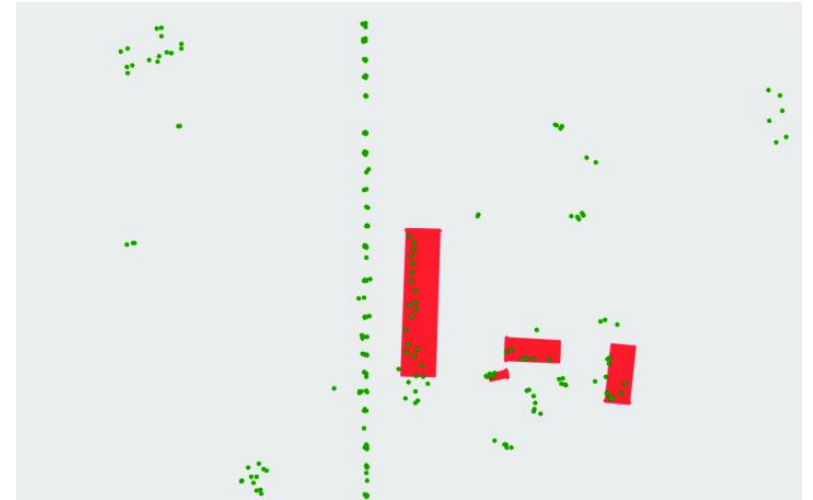
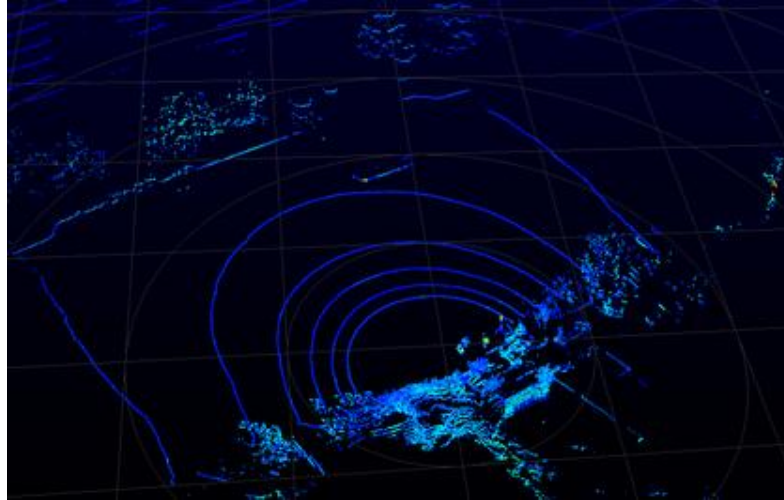
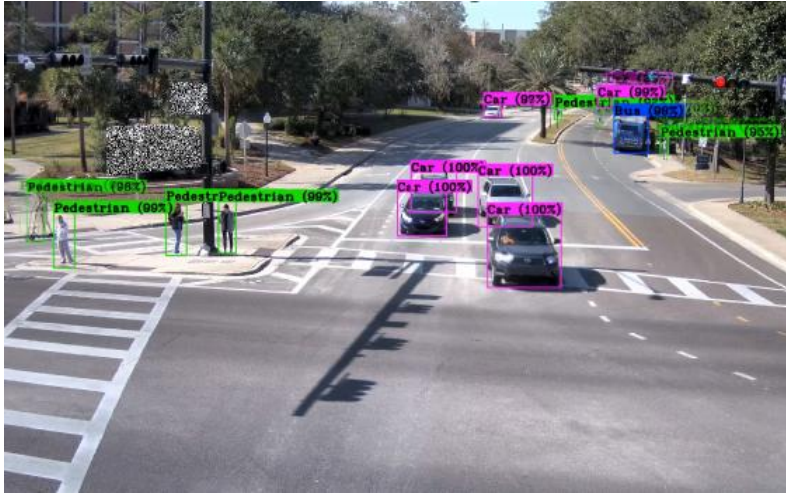
Before training



After training



Currux Vision's AI Computer Vision vs Other Sensors



Computer Vision

Generates millions of dense, high-resolution pixel points per frame, and encodes them into “embeddings,” rich, multi-dimensional representations of objects —shape, color, texture, motion patterns, and environmental context.

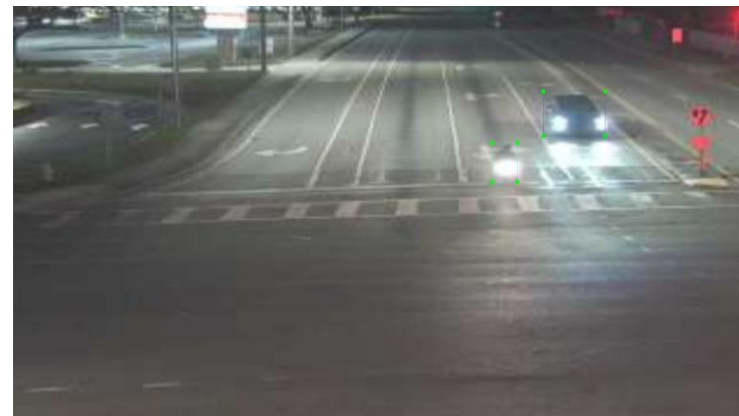
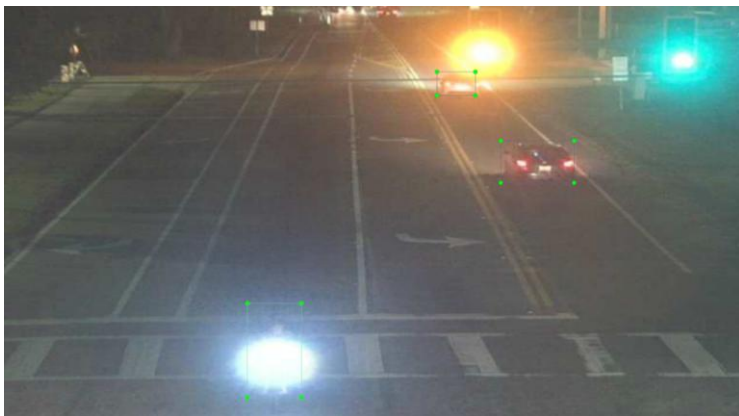
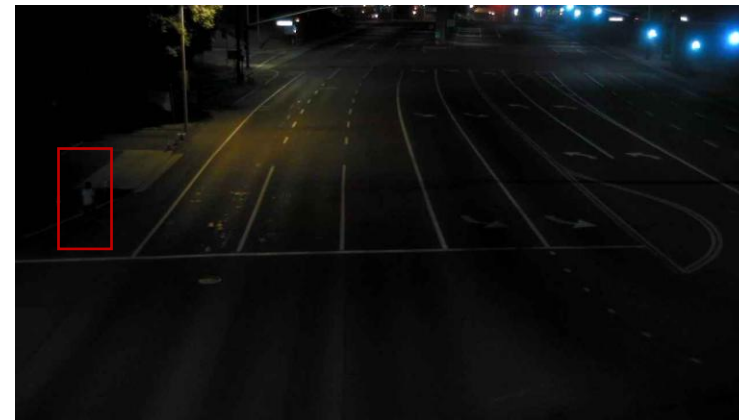
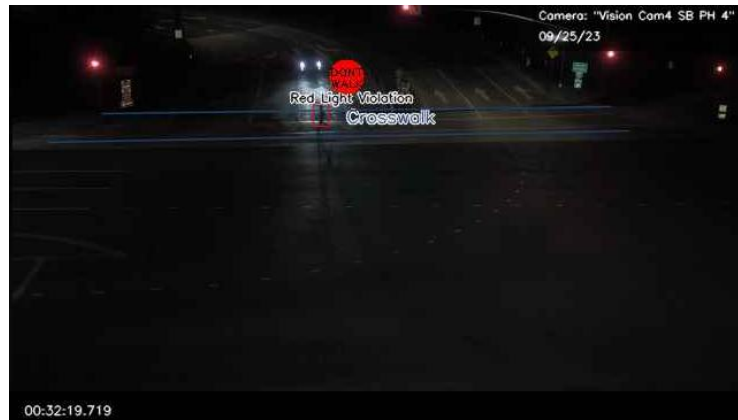
LiDAR

LiDAR for detection produces sparse point clouds, often with only 2–3 points on small objects like pedestrians or bikes

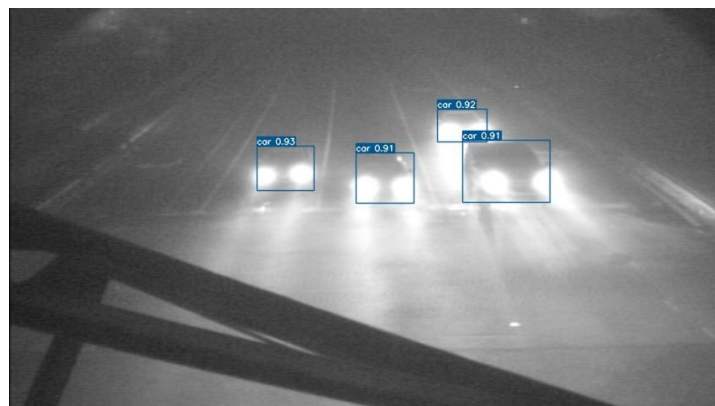
Radar

Radar provides just 1–5 sparse points per object, with no shape or appearance detail. In this image, green are the radar points and red are the ground truth boxes.

PED Detection at Night



Accurate Detection with Low-Visibility: Rain, Snow, Fog



04

Core and Optional Modules with Reports



Over speed
Speed: 60mph
Car/NB34CA

Car on crosswalk!
Speed: 60mph
Car/KJ43LAA

Pedestrian
Pedestrian



Standard SmartCity ITS Package with Detection

A complete edge-based detection and signal actuation system—designed for fast deployment and reliable day-to-day performance.

NTCIP / SDLC Detection and Actuation Module

Real-time signal actuation through direct controller integration using industry-standard protocols.



Digital Twin

Live intersection visualization with real-time phase calls



Twin Controller Timing Recommendation

Optimized signal timing suggestions through direct integration with the traffic controller via NTCIP.



Standard & Turn Count Analytics Report

- Counts, speed, and avg. speed by lane and vehicle class
- Intersection counts by turn movement and vehicle class,
- Reports can be automatically sent by email or FPT server



Real-Time Notifications

Instant email / text alerts for:

- Video Corruption
- Vehicle & Lane Stopped (Accident Alert)
- Controller in Flash & Stuck Detector



Cloud Monitoring (Optional)

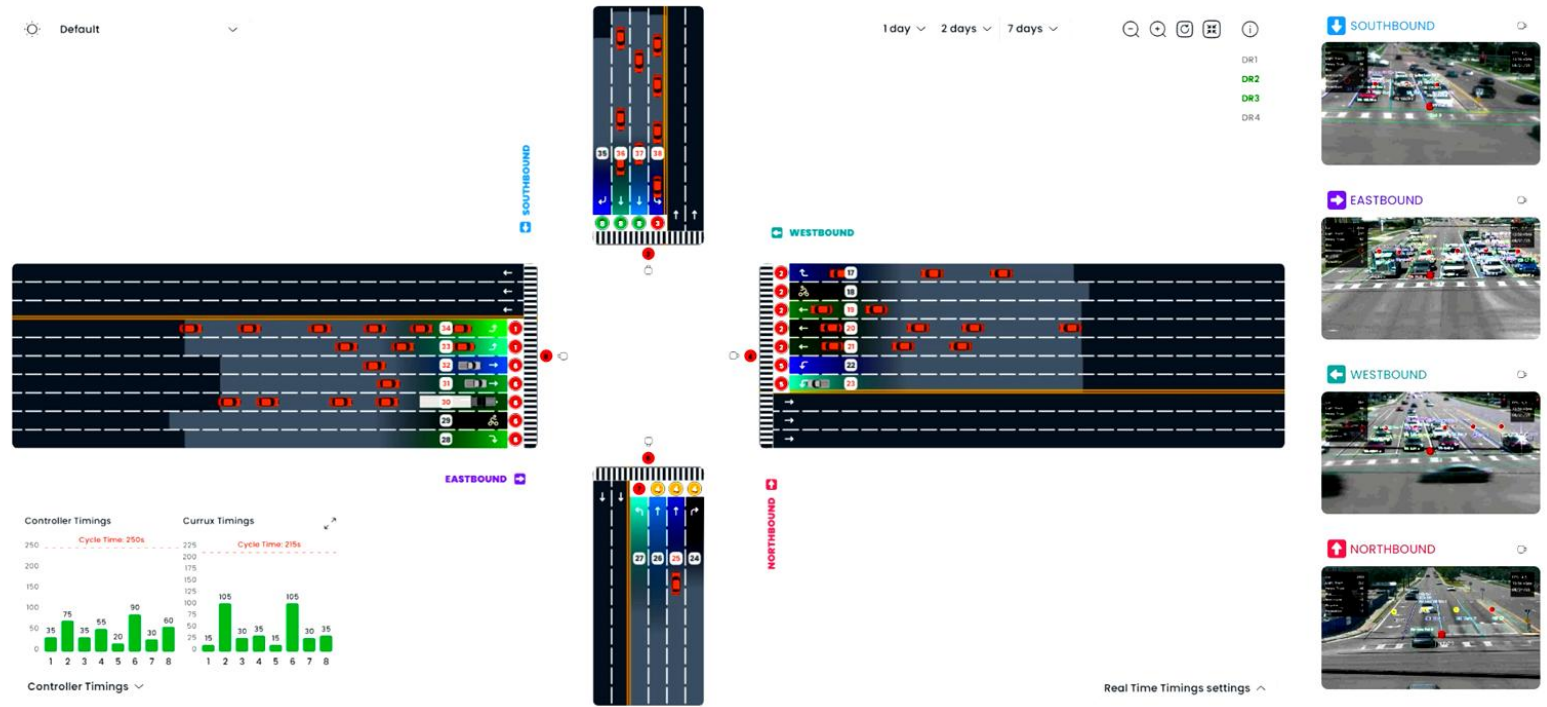
Remote access for deployment health monitoring and aggregated data viewing via secure cloud dashboard.



Core Capabilities: Detection, Actuation & Analytics

Digital Twin

- Real-time intersection view synced with live traffic and camera data
- Lane-level detection and phase assignment visualization, providing a visual confirmation by approach
- Dynamic green time, pedestrian priority, and cycle time adjustments



- Compares controller vs. Currux-optimized signal cycles for units with NTCIP connection



Standard Analytics Report

- Counts by lane by category
 - Car
 - Light Truck
 - Heavy Truck
 - Bus
 - Motorcycle
 - Pedestrian Bicyclist
- Speed & Average Speed by lane
- API Outputs for counts, classification and speed per lane

Report

Select a period
Last 7 days

Select a Time Range
1 hour

Select a Camera
SR580 @ Belcher NB x | SR580 @ Belcher SB x | SR580 @ Belcher WB x | SR580 @ Belcher EB1 x

Select an Event
Wrong Direction x | Lane Stopped x | Car Stopped at Intersection x | Crosswalk Violation x | Near Miss x | Red Light Crossing Alert x | Video Corruption Alert x
Stuck Detector Alert x | Controller in Flash x

Crosswalk speed units
 mph ft/s

[Get Report](#)

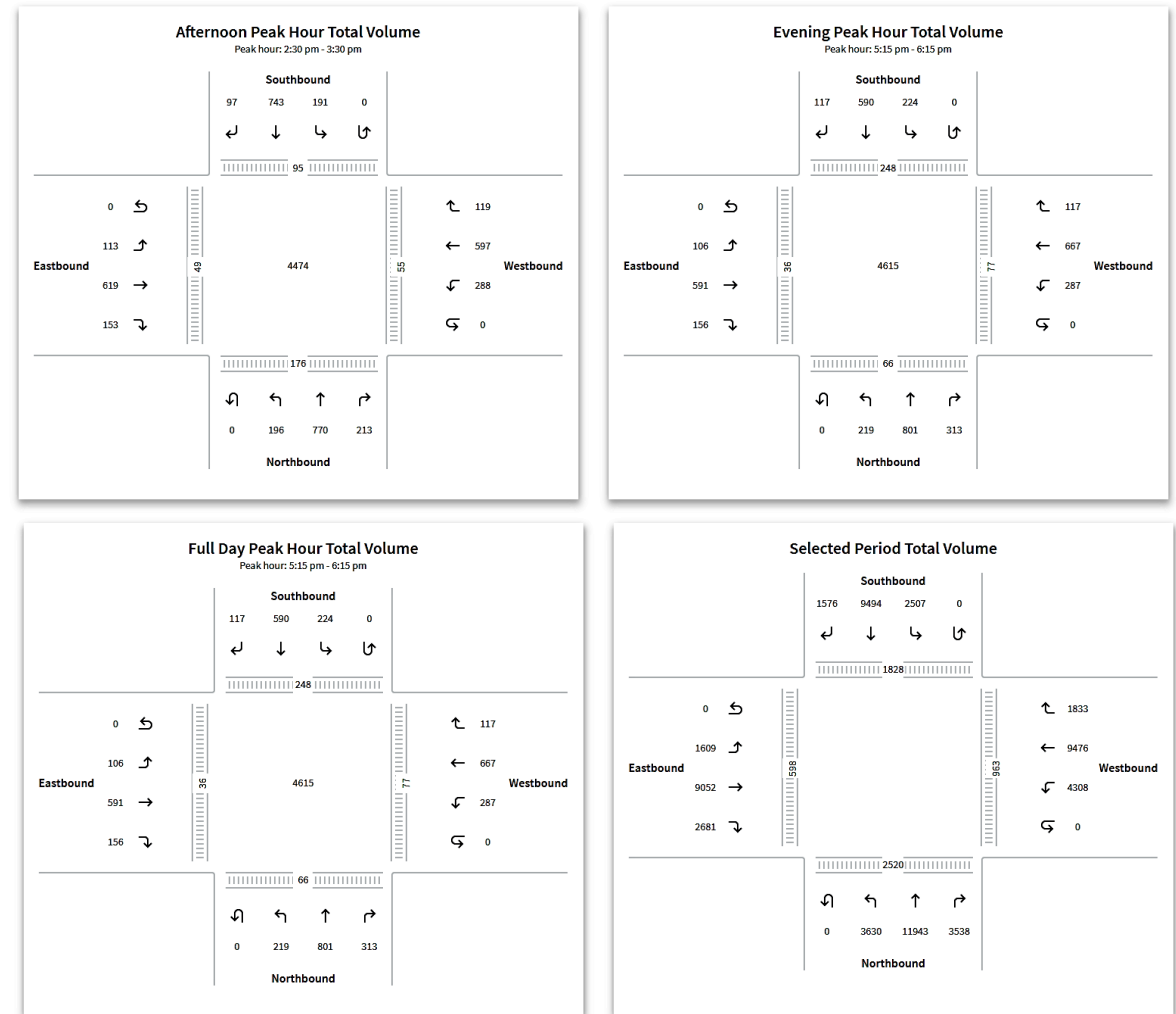
Download Report | [PDF](#) [CSV](#)

- Reports generate automatically and can be received by email daily or weekly if internet access is present.
- Reports can be exported in PDF and Excel.
- Reports can be generated in real time and viewed in browser



Turn Count Analytics Report

- Intersection level counts by turn movement and vehicle class
- Crosswalk ped and bike counts by approach
- 5 to 60 minutes time bins
- Reports generate automatically and can be received by email daily or weekly if internet access is present.
- Reports can be exported in PDF and Excel.
- Reports can be generated in real time and viewed in browser



Core Capabilities: Detection, Actuation & Analytics



Instant Alerts:







Standard Real-Time Notifications

- Video Corruption Alert
- Vehicle Stopped / Accident Alert
- Stuck Detector Alert
- Controller in Flash Alert

Optional Real-Time Notifications

- Speeding
- Red Light Violation
- Crosswalk Violation
- Wrong Direction
- Double Line Crossing
- And more.....

Latest Notifications

| | | |
|---|---|---|
|  |  |  |
| Red Light Crossing Alert Date: 2025-05-05 10:24:42 Camera: Curlew Rd @ Gullaie SB Lane: Crosswalk Vehicle Type: Pedestrian | Red Light Crossing Alert Date: 2025-05-05 10:24:36 Camera: Curlew Rd @ Gullaie SB Lane: Crosswalk Vehicle Type: Pedestrian | Red Light Crossing Alert Date: 2025-05-05 05:40:53 Camera: Curlew Rd @ Gullaie SB Lane: Crosswalk Vehicle Type: Pedestrian |
|  |  |  |
| Red Light Crossing Alert Date: 2025-05-05 05:33:06 Camera: Curlew Rd @ Gullaie SB Lane: Crosswalk Vehicle Type: Pedestrian | Red Light Crossing Alert Date: 2025-05-05 04:29:07 Camera: Curlew Rd @ Gullaie SB Lane: Crosswalk Vehicle Type: Pedestrian | Red Light Crossing Alert Date: 2025-05-05 00:46:49 Camera: Curlew Rd @ Gullaie SB Lane: Crosswalk Vehicle Type: Pedestrian |

- View notifications remotely from the cloud
- Notifications include the event type, date and time, camera ID, lane, vehicle class, and before-and-after snapshots with timestamps for visual confirmation.
- Event Notifications can be received instantly through email or text



Additional SmartCity ITS Modules

For agencies seeking deeper operational insight, enhanced safety, and proactive traffic optimization.

Advanced Traffic Analytics Report



Metrics such as average queue length, 85th percentile speed by lane, level of service (LOS), and more

Safety Analytics / Near Miss Module



Trajectory-based conflict analysis and heatmaps to identify risk areas in real time

RSU / Connected Vehicle Module with API Integration



Integrates with roadside units for CV2X communication and external system interoperability

Enhanced Real-Time Notifications



Instant email / text alerts for red light running, speeding, double line crossing, false/missed detection call and more

Train Detection & Actuation Module



Detects stopped and approaching trains, actuates signals or relays accordingly

IO Relay Activation Module



Supports relay-based device control such as flashing signs, gates, or third-party hardware

Adaptive / Signal Timing Optimization Module



Self-contained adaptive signal control with real-time timing adjustments

Adaptive Pedestrian Module



Dynamic pedestrian detection and phase adjustment based on real-time conditions

Garage Occupancy Monitoring & Notification System



Tracks and reports vehicle entry/exit counts with real-time availability status



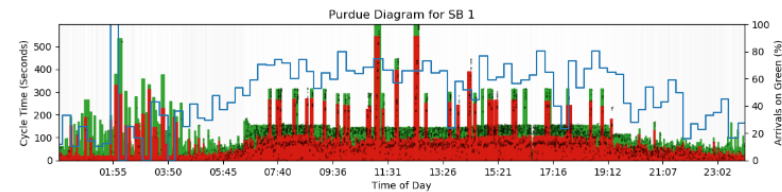
Advanced Analytics Report

- Lane Occupancy (Queue Length)
- Average Speed
- 85th Percentile Speed
- Average Wait Time
- HWT – Contact Car in Front
- Vehicle Counts
- Vehicle Stop Counts
- Passing Time
- Free Flow vs Sat Flow
- Gap Time
- Arrivals on Green
- Total Delay

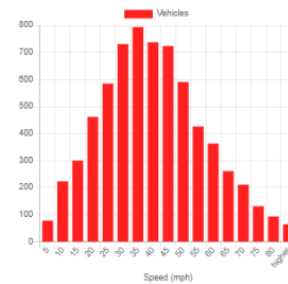
| # | Lane | Average Queue Length (count) | Average Speed (mph) | 85th Percentile Speed (mph) | Average Wait Time (sec) | HWT | Vehicle Counts (cars) | Vehicle Stop Counts (cars) | Avg Occupancy (%) | Saturated Flow | Gap Time (sec) | Time to clear the queue (sec) | AG (%) | LOS | Total Delay (sec) |
|---|------|------------------------------|---------------------|-----------------------------|-------------------------|-----|-----------------------|----------------------------|-------------------|----------------|----------------|-------------------------------|--------|-----|-------------------|
| 1 | NB T | 3.1 | 25 | 25 | 18 | 3.3 | 4582 | 1473 | 47.7% | 20% | 18.3 | 15.7 | 89 | B | 87055 |
| 2 | NBT | 2.7 | 25 | 25 | 16 | 3.1 | 4437 | 1223 | 44% | 23% | 19.4 | 15.2 | 92 | B | 71981 |
| 3 | NBLT | 2 | 19 | 19 | 25 | 3.4 | 1396 | 680 | 29% | 14% | 61.5 | 13.9 | 81 | C | 35239 |

Show By Time Table

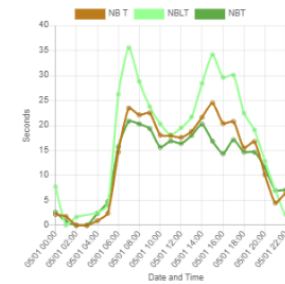
Purdue Diagram



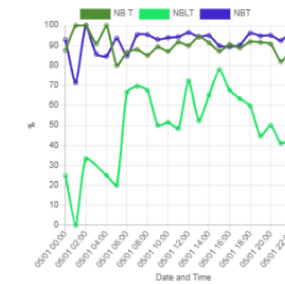
Speed Distribution



Average Wait Time Distribution



Arrivals on Green Graph



- Reports can be generated in real time and viewed in browser
- Reports generate automatically and can be received by email daily or weekly if internet access is present.
- Reports can be exported in PDF and Excel.



Adaptive & Signal Timing Optimization

Over speed
Speed: 60mph
Car/NB34CA

Car on crosswalk!
Speed: 60mph
Car/KJ43LAA

Pedestrian

Pedestrian

Adaptive & Signal Timing Optimization

Combines real-time AI-powered detection with historical traffic data to dynamically adjust signal timing every few seconds based on actual traffic conditions.

Historical Traffic Analytics



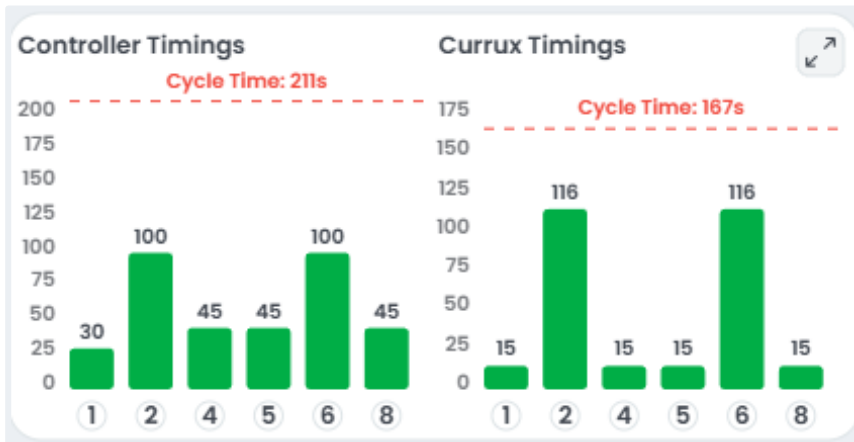
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Real-Time Detection



Key Benefits:

- **Reduction in Delay, Time to Clear the Queue and Wait Times**
Suppresses low-demand side-street phases and prioritizes heavily-used approaches based on predicted arrivals
- **Increases in Arrivals on Green and Saturated Flow**
Dynamic Green Time Adjustment through continuous recalculation
- **Scalable**
From single intersections to multi-intersection corridors
- **User-Defined Flexibility**
Still gives user freedom and control over signal timing with customizable configurations



Corridor-Wide Adaptive Signal Timing Optimization

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Expand to a Connected Corridor of Adaptive Intersections

Leverages real-time vehicle detection and inter-intersection communication to coordinate signal plans across the entire corridor.

Automatically applies optimal timing at each intersection, replacing static TOD schedules and manual adjustments.



01 Real-Time Data Sharing

Intersections exchange detection and phase state information for coordinated decision-making.

02 Predicted Vehicle Arrivals

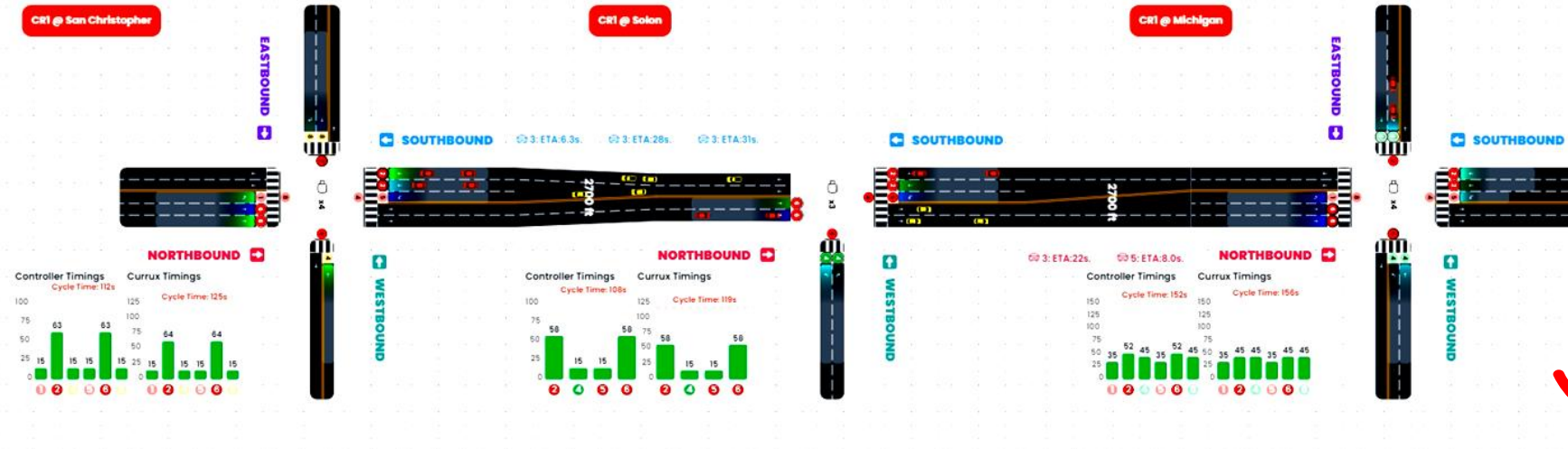
Detection data is used to anticipate downstream arrivals, extending green phases on main arterials to maintain vehicle progression and reduce idle time.

03 Suppressed Side-Street Calls

Temporarily delays low-priority phases when mainline vehicles are approaching.

Corridor-Wide Adaptive Signal Timing Optimization

Recent Successful Corridor Adaptive Deployment



After connecting the units to the central server, the entire corridor was **online and running** adaptive timings in under 30 minutes.



**25%
Reduction
in Delay**

Significant *decreases* in **Time to Clear the Queue and Wait Times** by anticipating downstream arrivals, extending green phases on main arterials, and suppressing calls to low-priority phases.



**40%
Increase
in Travel
Time
Reliability**

Arrivals on Green (AG%) and Saturated Flow *increased*, as adjustments ensured vehicles reached the next intersection just as the light turned green.



Accurate Detection for Safety Priority

Over speed
Speed: 60mph
Car/NB34CA

Car on crosswalk!
Speed: 60mph
Car/KJ43LAA

Pedestrian

Pedestrian



Safety Analytics with Near Miss

Scatter Report:

- Shows where vehicles, pedestrians and bicyclists come into conflict – areas of potential danger for peds/bikes
- Where peds tend to cross mid-block.



| # | Lane | Number of Vehicles | Crosswalk Violations | Car Stopped at Intersection | HWT | Red Light Crossing | Near Misses | Lane Stopped | 85th Percentile Speed(mph) | Speeding | % of Cars Speeding |
|---|------------|--------------------|----------------------|-----------------------------|-----|--------------------|-------------|--------------|----------------------------|----------|--------------------|
| 1 | Through | 2146 | 0 | 0 | 2.8 | 0 | 0 | 0 | 44 | 200 | 0.09% |
| 2 | Left Turn | 154 | 0 | 0 | 4.9 | 0 | 0 | 0 | 4 | 0 | 0% |
| 3 | Right Turn | 50 | 0 | 0 | 4.7 | 0 | 0 | 0 | 32 | 0 | 0% |



Near Miss Trajectory Analytics

Full trajectory based near miss analysis – Near Miss Trajectories – that will display the trajectories of objects with TTC of 0-2.5 seconds

| | | | | | | | | | | | | | |
|---|-----------|----|---|---|---|---|---|---|---|----|---|----|----|
| 4 | Crosswalk | 57 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 0% | 44 |
| 5 | D5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% | 0 |
| 6 | D8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0% | 0 |

Near Miss Trajectories

Threshold 0 sec 1.5 2.5 sec

Trajectory ← 1 205 all →

Mouse Pen Rectangle Sliders Eraser

| # | Lane | Number of Vehicles | Crosswalk Violations | Car Stopped at Intersection | HWT | Red Light Crossing | Near Misses | Lane Stopped | 85th Percentile Speed(mph) | Speeding | % of Cars Speeding |
|---|------------|--------------------|----------------------|-----------------------------|-----|--------------------|-------------|--------------|----------------------------|----------|--------------------|
| 1 | Through | 2146 | 0 | 0 | 2.8 | 0 | 0 | 0 | 44 | 200 | 0.09% |
| 2 | Left Turn | 154 | 0 | 0 | 4.9 | 0 | 0 | 0 | 4 | 0 | 0% |
| 3 | Right Turn | 50 | 0 | 0 | 4.7 | 0 | 0 | 0 | 32 | 0 | 0% |

Near Miss Trajectory Replay

Replay specific Near-Miss events and see the post-encroachment trajectories of the vehicles, pedestrians or bicyclists involved

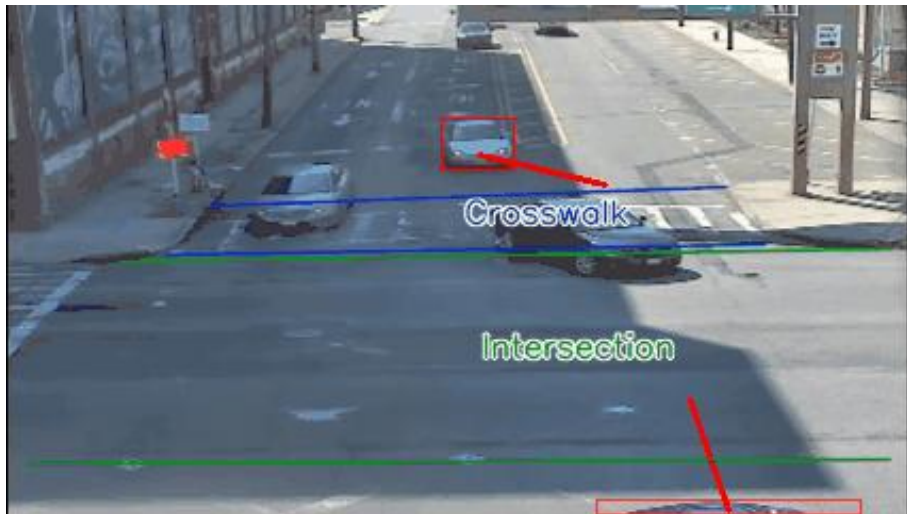


Threshold 0 sec 0.25 2.5 sec

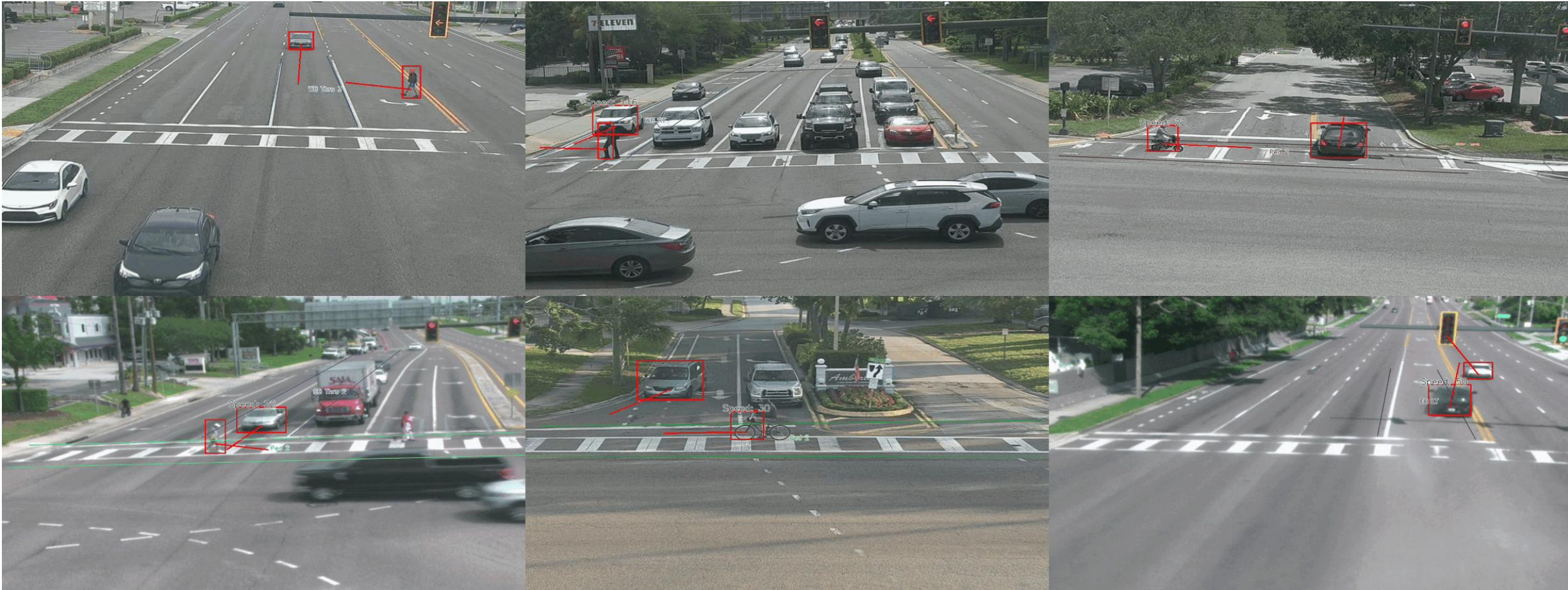
Trajectory ← 1 48 all →

▶

Accurate, Real-Time Near Miss Detection



Recent Pedestrian Near-Miss Event Notifications



<https://drive.google.com/file/d/10tgIF16vDUa4ko8RAGqxr6xfESCwSGQ-/view?usp=sharing>

05



Tools for Quick Configuration

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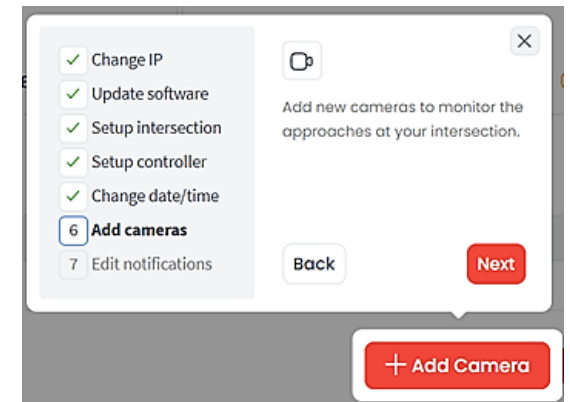
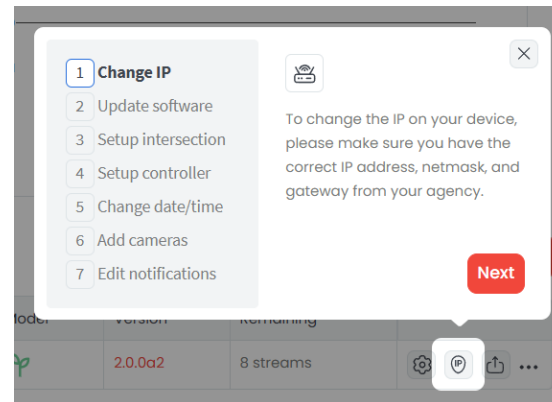
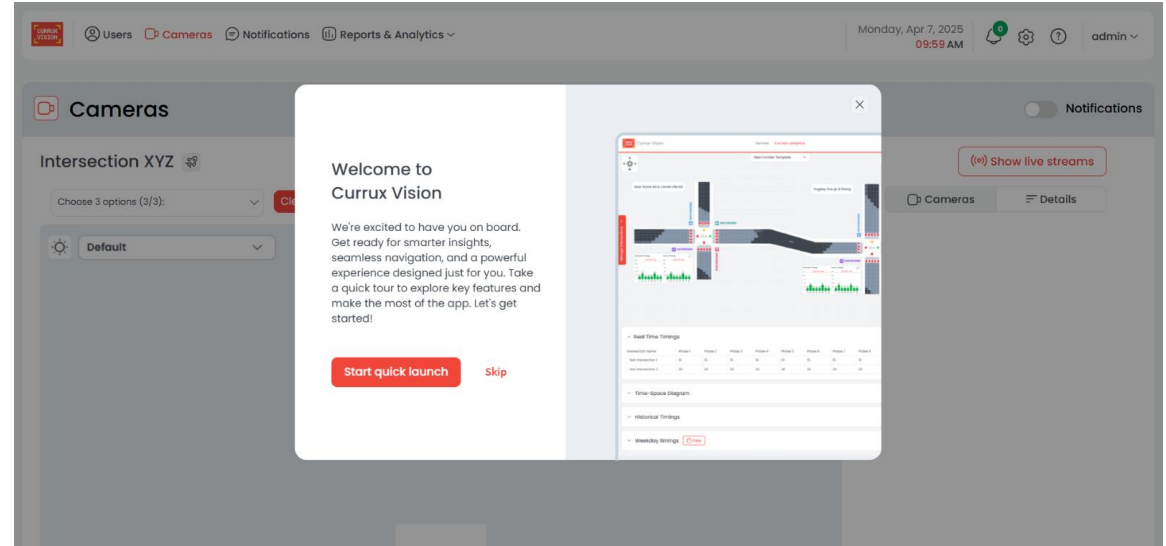
Pedestrian

Pedestrian



Fast, Guided Setup for Deployment—Built for Field Technicians

A step-by-step guide that follows the most logical order in configuration setup, reducing guesswork and preventing errors



Contact Us

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Pedestrian