

Improving Roadway and Intersection Safety

for Tribal and Rural Communities

Using Cost-Effective Sensing and Communication Technologies

Luyang Gong Director of Product Management, AIWayision



AIWAYSION



Western District Meeting

Bellevue, Washington • June 28-July 1, 2026

A Community of Transportation Professionals

Hyatt Regency Bellevue, WA

June 28 – July 1, 2026

2026 ITE Western District Annual Meeting

Yakama Nation Engineering | AIWayision

Bellevue, Washington | June 28–July 1, 2026

Yakama Nation

- Federally recognized tribe
- Over one million acres
- 1,200 miles of public roads, most are in rural areas



Tribal Transportation Program

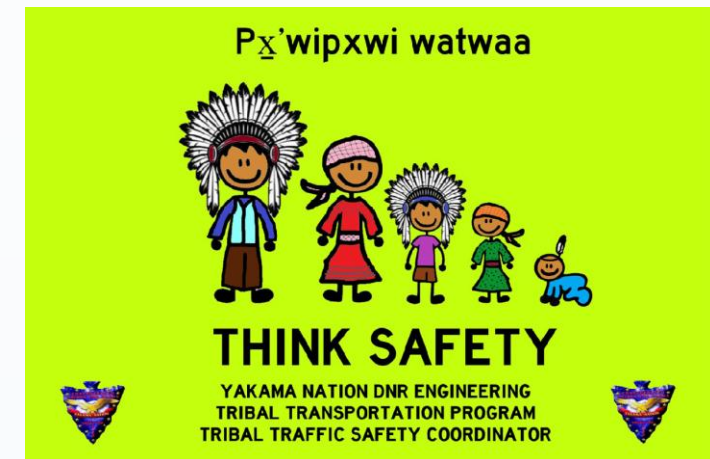
Yakama Nation Department of Natural Resources (DNR)

— Engineering

- Graysen Squeochs, P.E., Program Manager
- Portia Shields, Data Manager

— Tribal Transportation

- Brent Demko, Engineering Planner III
- Dwayne Valentine, P.E., Traffic Engineer
- Kaylee Jim, Transportation Safety Coordinator
- Teipum Sohappy, Transportation Safety Assistant
- Hugo Baeza, Engineering Technician



Tribal Traffic Safety Committee

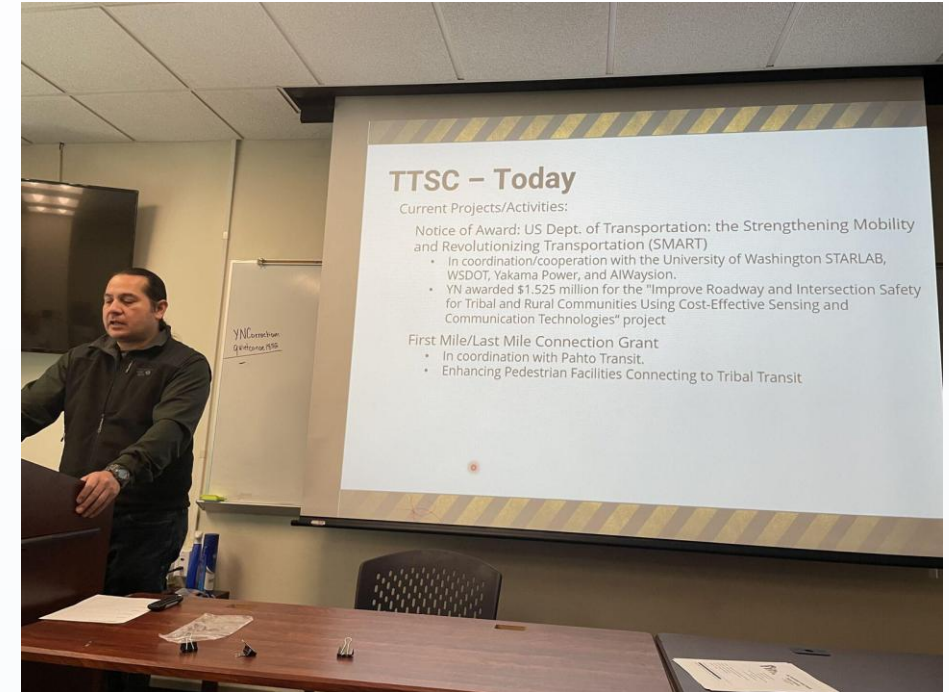
The Tribal Traffic Safety Committee (TTSC) was formed in 2017 by Tribal Council resolution T-067-17 to address all aspects of traffic safety membership includes Yakama Nation staff with experience and knowledge to:

- Determine/Identify traffic safety issues
- Develop strategies and goals
- Obtain funding to support safety projects
- Recommend policy amendments toward improving traffic safety and eliminating traffic related injuries and fatalities of tribal members and the general public living on or near Yakama Nation lands.

Tribal Traffic Safety Committee

Multi-Agency Participation

- Washington State Department of Transportation
- City of Toppenish
- Washington State Patrol
- University of Washington
- Yakima County
- Yakima Valley Conference of Governments
- Yakama Nation Tribal Police Department
- Washington Traffic Safety Commission
- and others



Quarterly TTSC meetings in Toppenish



US 97 Corridor Safety Issues

US 97 – Toppenish to Union Gap – Corridor

- A history of severe and fatal collisions
- Over the last 10 years: 350 serious injury crashes and 22 fatal crashes

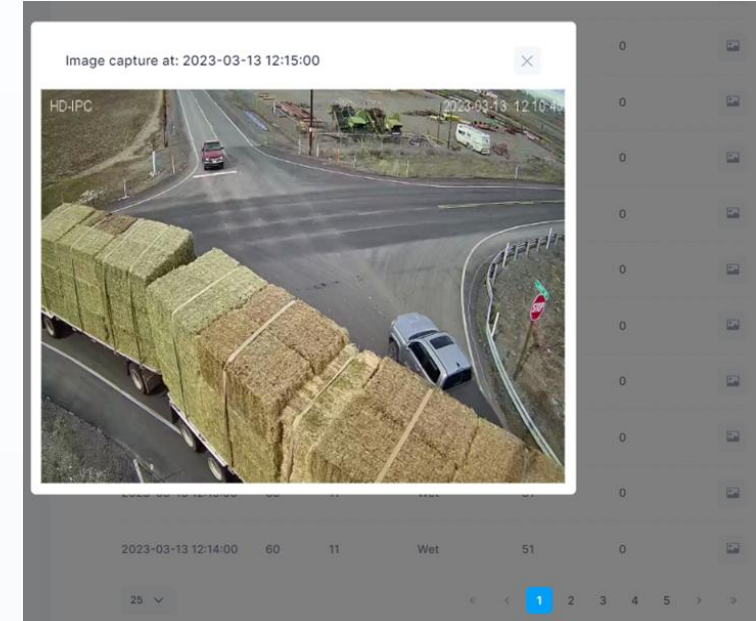
US 97 CRASH HISTORY 2001 - 2021

	Lateral A	2nd Avenue	Jones Road	W. Wapato Road	S. Wapato Road	McDonald Becker	Buster	Fort Road	SR 22	Larue Road	SR 22 SR 223
Fatalities	1	1	3	3	2	2	1	2	2	7	0
Injuries	55	20	35	78	22	56	21	73	38	26	11
Collisions	89	36	52	163	58	59	29	113	101	33	24



Lack of Data/Visibility

- **Conventional data collection equipment is too costly and not feasible**
 - Significant funding is required for infrastructure upgrades, including power, internet, and communication systems
 - Requires technical personnel and technologies to manage, visualize, and analyze the data collected
- **Specific data collection needs**
 - Movements of semi-trucks & agricultural vehicles
 - Road environment conditions: snow and icy road surface, heavy fog/low visibility, animal crossings, wildfire smoke, etc.



Data collected by MUST

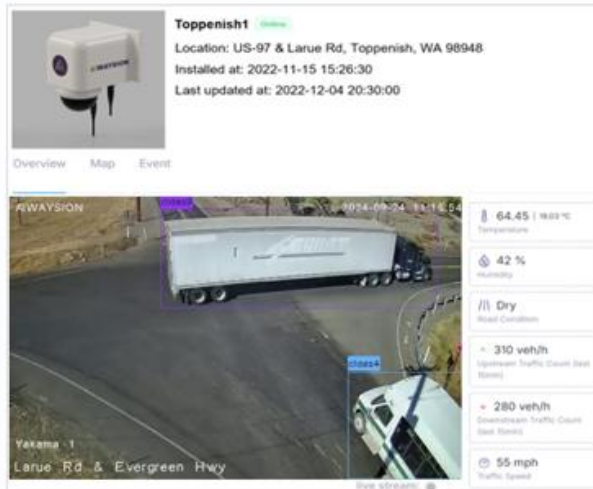
sensors

2026 ITE Western District
Annual Meeting

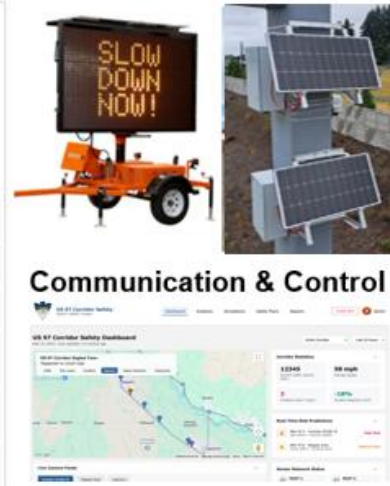
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Yakama Nation FY24 SMART Project

2023 FHWA Innovative Project Award and Best All Around Award
2025 WA Safe Systems Champion Award recipient



Road Safety Information System



Digital Twin & LLM Intelligence



Edge AI Device for Traffic & Road Conditions Monitoring and Hazardous Events Detection



Trucks & Tactors



Road Conditions (Snow, Ice, Wet, Low Visibility, etc.)



Pedestrian Safety



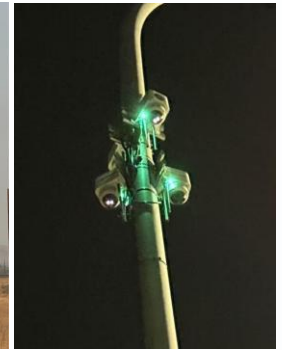
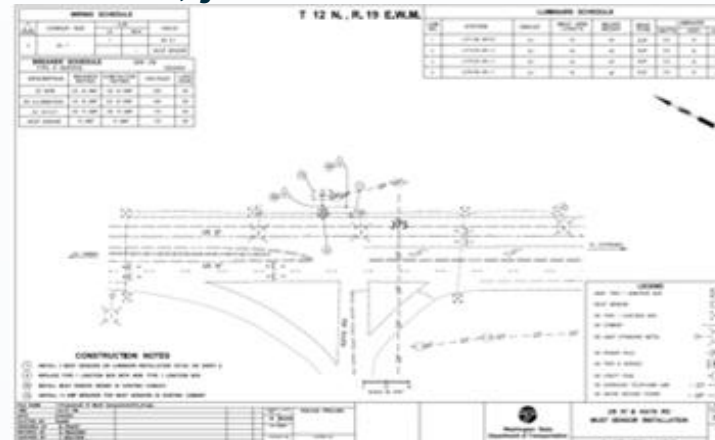
Collision/Near Miss



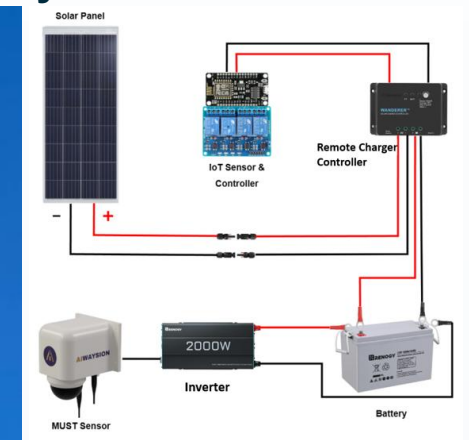
Site Assessments & Grid + Solar Deployments



Cabinet, junction box & conduit



Grid-powered deployments



Solar-powered deployments



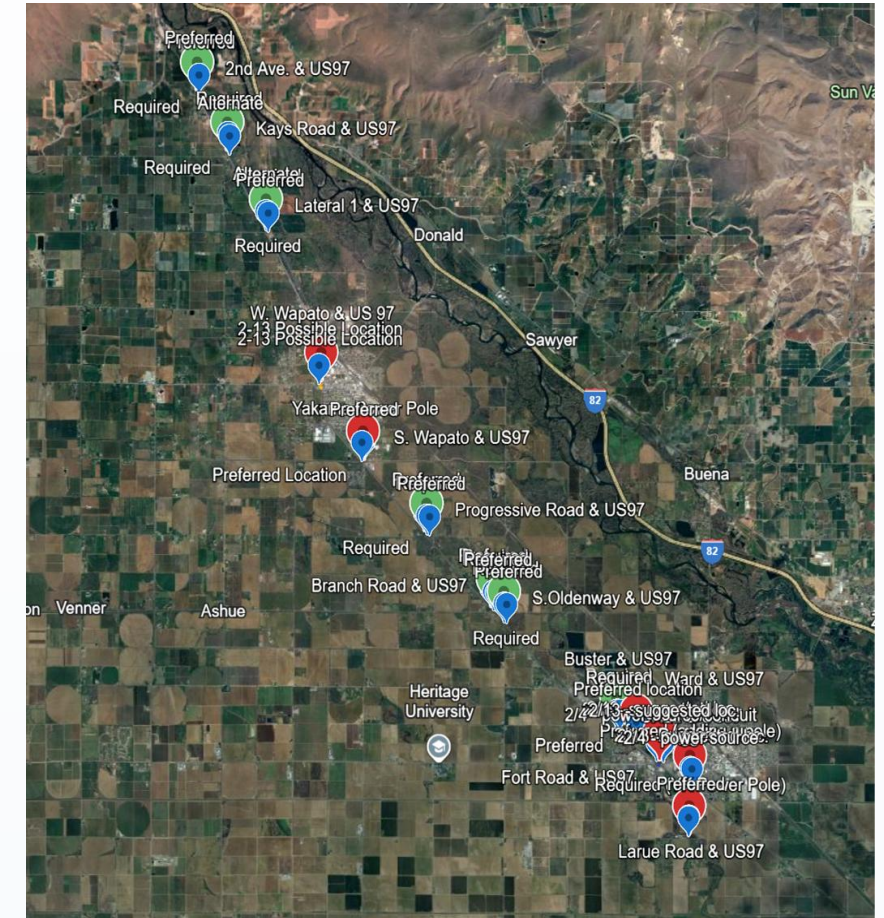
Deployment of Roadside Edge AI Devices

✓ 7 Intersections: Grid-Powered Installations

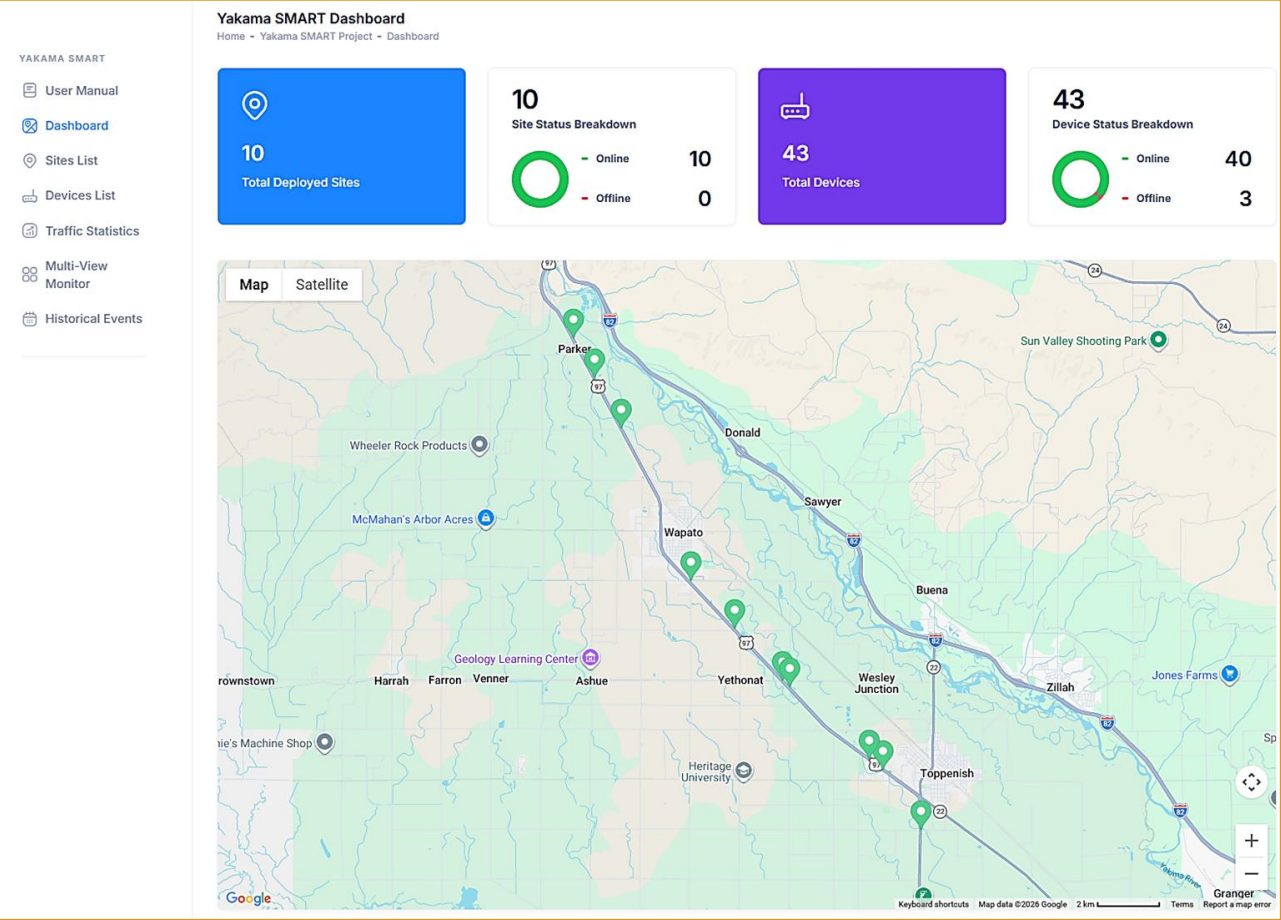
- 2nd Avenue & US 97
- Kays Road & US 97
- Lateral 1 & US 97
- Progressive Road & US 97
- Branch Road & US 97
- South Oldenway & US 97
- Buster Road & US 97

✓ 6 Intersections: Solar-Powered Installations

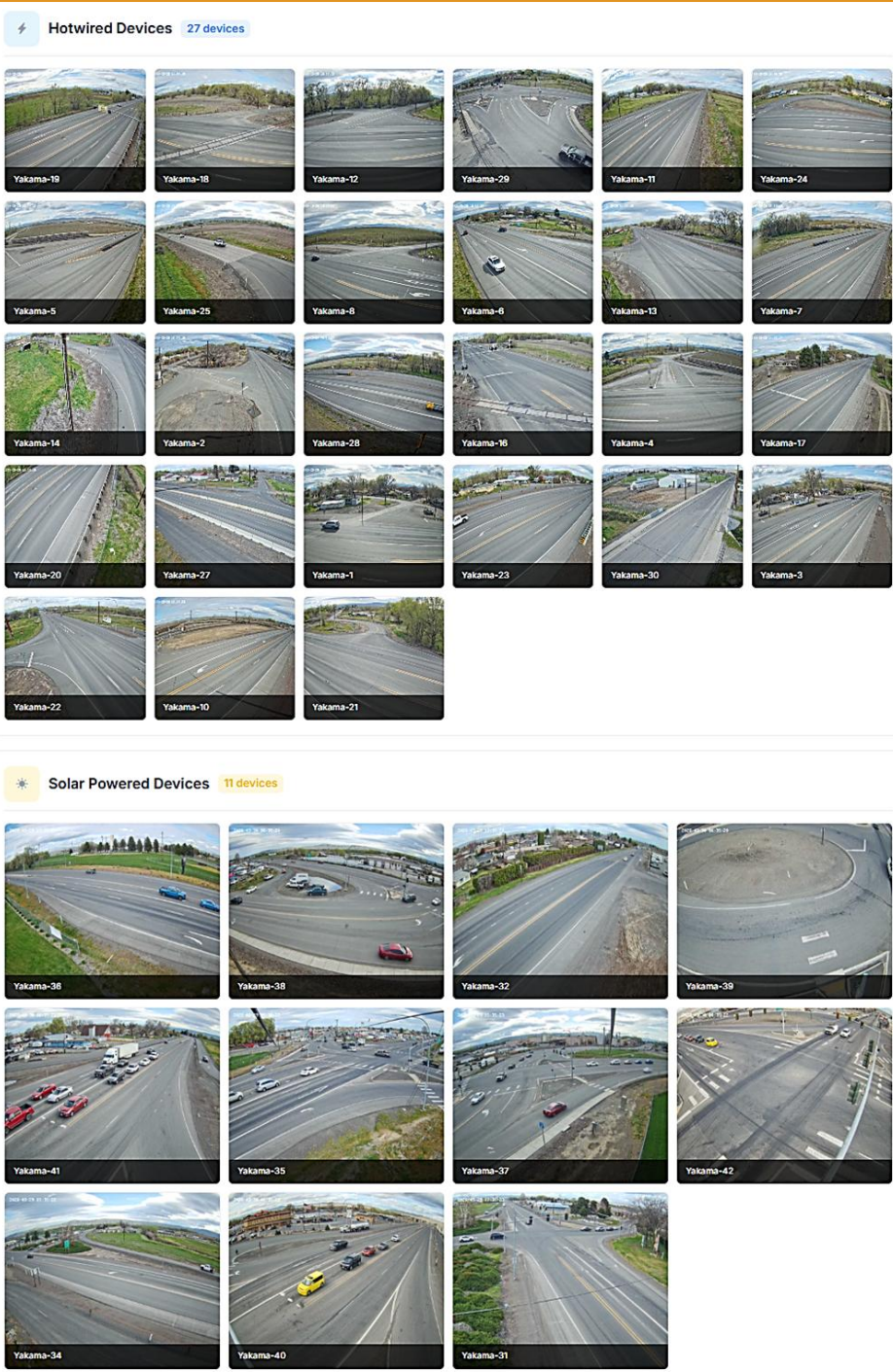
- West Wapato Road & US 97
- South Wapato Road & US 97
- Ward Road & US 97
- Fort Road & US 97
- SR 22 & US 97
- Larue & US 97



Web Dashboard & Virtual TMC

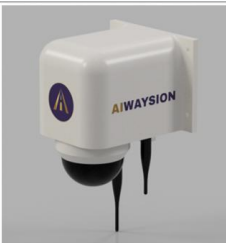


Site & device management, real-time traffic monitoring
on *WaysionNet* web dashboard



Traffic Data

Real-time & historical traffic data, visualization & analysis & report



Toppenish1 Online
Location: US-97 & Larue Rd, Toppenish, WA 98948
Installed at: 2022-11-15 15:26:30
Last updated at: 2022-12-04 20:30:00

Overview

History

Analytics

Map

Event

AIWAYSION

class9

2024-09-24 11:16:54

class4

Yakama - 1
Larue Rd & Evergreen Hwy

live stream:

64.45 | 18.03 °C

Temperature

42 %

Humidity

Dry

Road Condition

310 veh/h

Upstream Traffic Count (last 15min)

280 veh/h

Downstream Traffic Count (last 15min)

55 mph

Traffic Speed

YAKAMA SMART

User Manual

Dashboard

Sites List

Devices List

Traffic Statistics

Multi-View Monitor

Historical Events

US97 & Branch Rd

Site ID: 1d6d9a89 ...

Healthy

100%

% Site Health

of Devices

4 devices

Location

Lat: 46.403988, Lon: -120.378677 ↗

1,227

Events Today

58 mph

Avg Speed

07:00

Peak Hour

Live Camera View

Current camera snapshot

Refresh

Camera Online

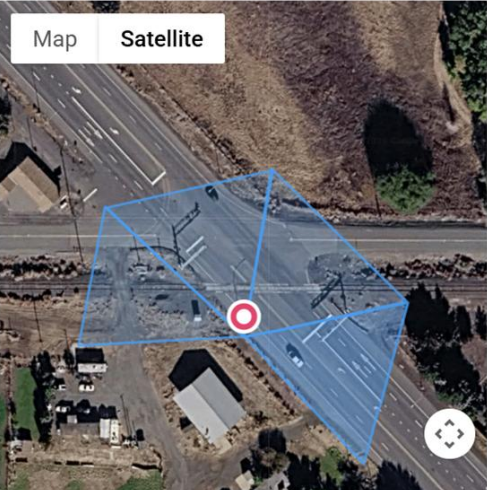
Last updated: 12:57:53 PM

2026-03-13 11:57:55



Map

Satellite



Start Date

End Date

Start Time

End Time

Lane

04/08/2026

04/08/2026

08:00 AM

05:00 PM

All Lanes

Filter

Download CSV

DATE/TIME	LANE	DIRECTION	TOTAL VOLUME	AVG SPEED	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
Apr 8, 2026, 4:49 PM	3	SE	74	21 mph	0	60	12	0	0	0	0	0	1	0	0	0	1
Apr 8, 2026, 4:49 PM	4	SE	32	51 mph	0	32	0	0	0	0	0	0	0	0	0	0	0
Apr 8, 2026, 4:49 PM	5	SE	49	49 mph	0	34	10	0	0	0	0	0	5	0	0	0	0
Apr 8, 2026, 4:49 PM	1	NW	37	55 mph	0	24	11	0	0	0	0	0	2	0	0	0	0

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Traffic and Safety Statistics

- YAKAMA SMART
- User Manual

Dashboard

Sites List

Devices List

Traffic Statistics

Multi-View Monitor

Historical Events

Release Notes

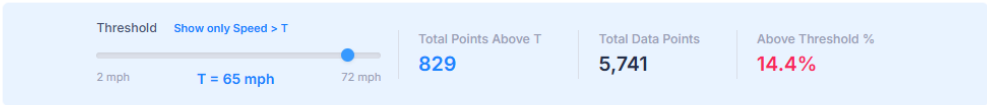
Traffic Statistics

Home - Yakama SMART Project - Traffic Statistics

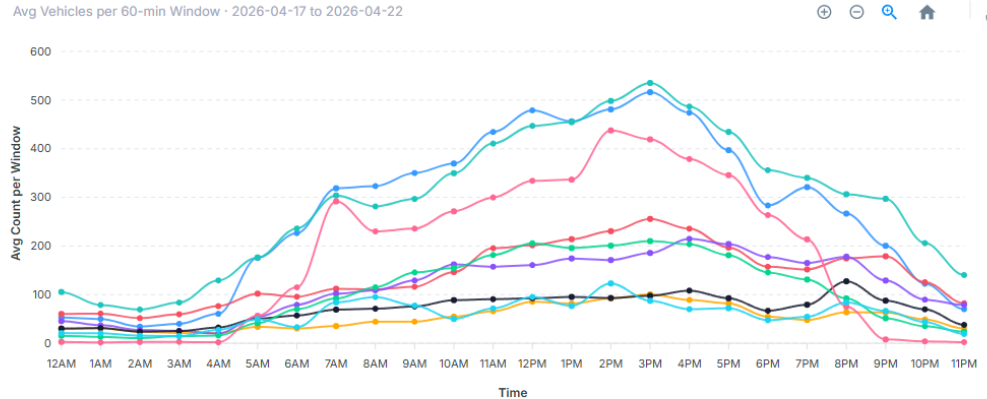
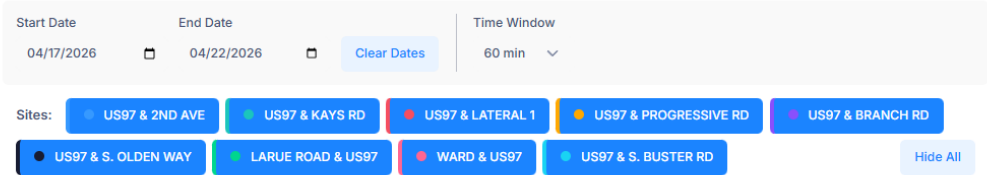
Traffic Statistics

Vehicle speed analysis, counting, and threshold monitoring

Updated 12:16:40 AM



Summary Table Speed Chart Counting Chart

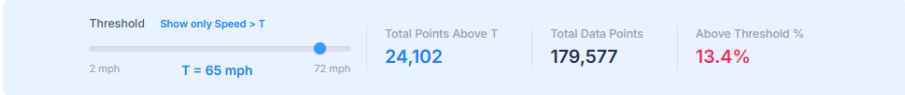


Real-time & historical traffic data, visualization & analysis & report

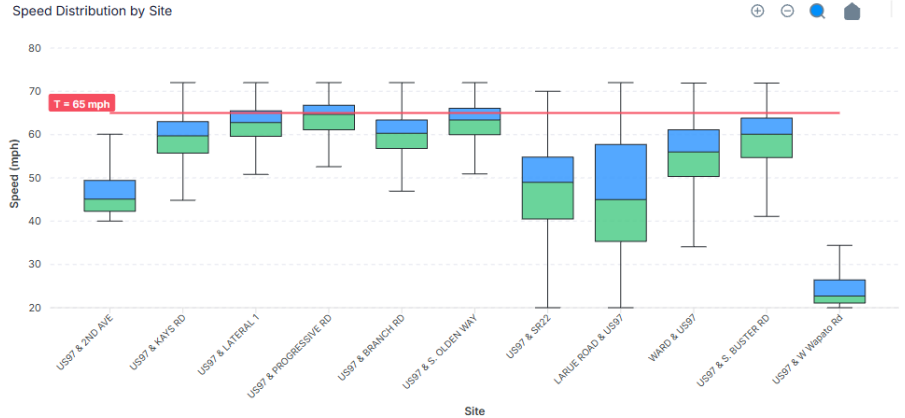
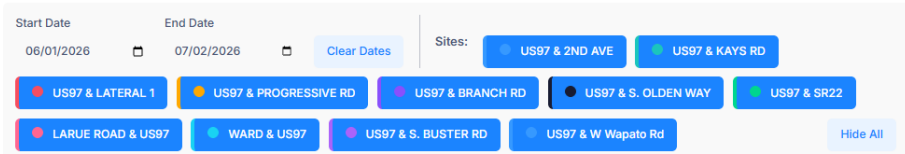
Traffic Statistics

Vehicle speed analysis, counting, and threshold monitoring

Updated 01:43:41 PM



Site Risk Ranking Speed Chart Counting Chart Summary Table

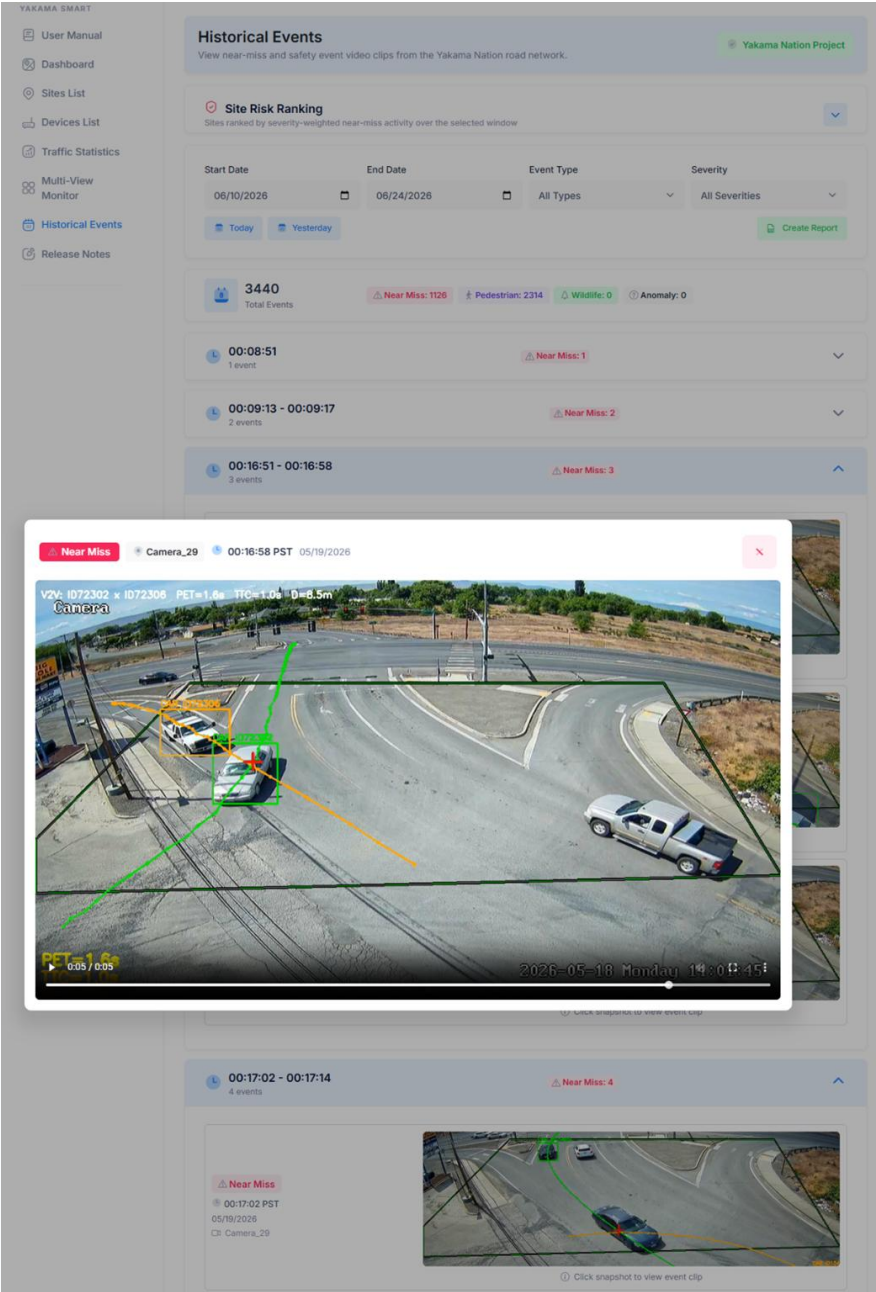


Site Risk Ranking Speed Chart Counting Chart Summary Table

Start date	End date	7d	14d	30d	8 sites - 822 events			
#	Site	Risk	Events	High	Low	Score		
1	US97 & Larue Rd	High	442	158	284	1074.0	View heatmaps	
2	US97 & S Wapato Rd	High	186	62	124	434.0	View heatmaps	
3	US97 & Kays Rd	High	155	15	140	215.0	View heatmaps	
4	US97 & Fort Road	High	10	7	3	38.0		
5	US97 & Buster Rd	High	16	2	14	24.0	View heatmaps	
6	US97 & Lateral 1 Rd	Low	9	0	9	9.0	View heatmaps	
7	US97 & SR22	Low	3	1	2	7.0		
8	US97 & Branch Rd	Low	1	0	1	1.0	View heatmaps	

Traffic Safety Events

Collision, Near miss,
Pedestrian, Stopped vehicle,
Wrong way driving, Road
surface conditions, Hazards,
Wildlife, Anomaly



Near-Miss Events based on Trajectory Analysis

Time-to-Collision (TTC), Post-Encroachment Time (PET)

TTC = 0.4 s, PET = 0.9 s



TTC = 0.3 s, PET = 1.6 s

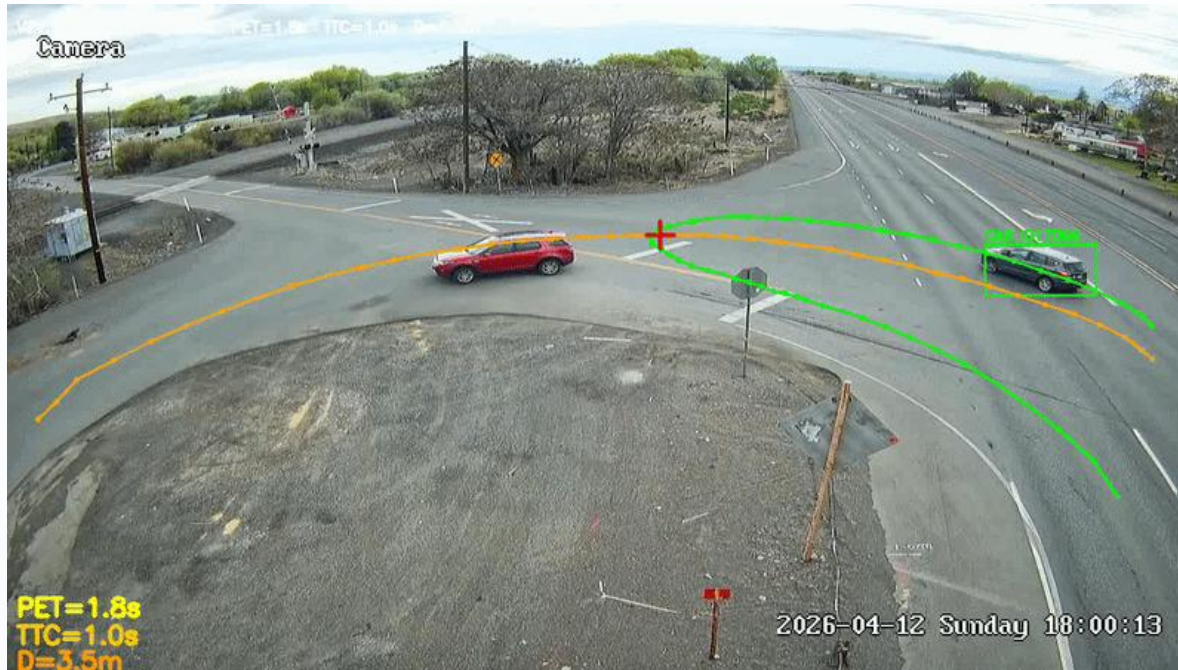


Deceleration (60 mph to 20 mph in 1.5 s) to avoid a crash

Near-Miss Events based on Trajectory Analysis

Post-Encroachment Time (PET), Time-to-Collision (TTC)

$TTC < 0.5 \text{ s}$, $PET < 1.5 \text{ s}$



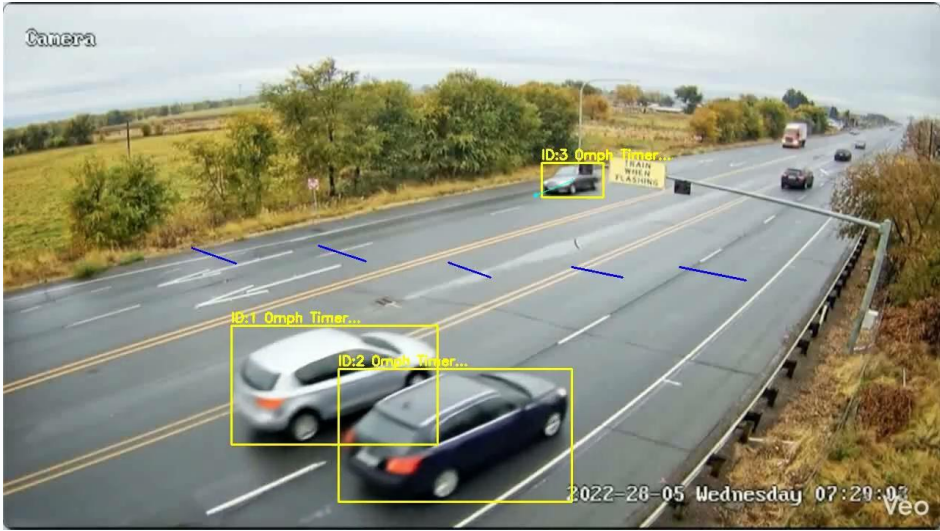
Near-Miss Events based on Trajectory Analysis

Post-Encroachment Time (PET), Time-to-Collision (TTC), Distance (D)



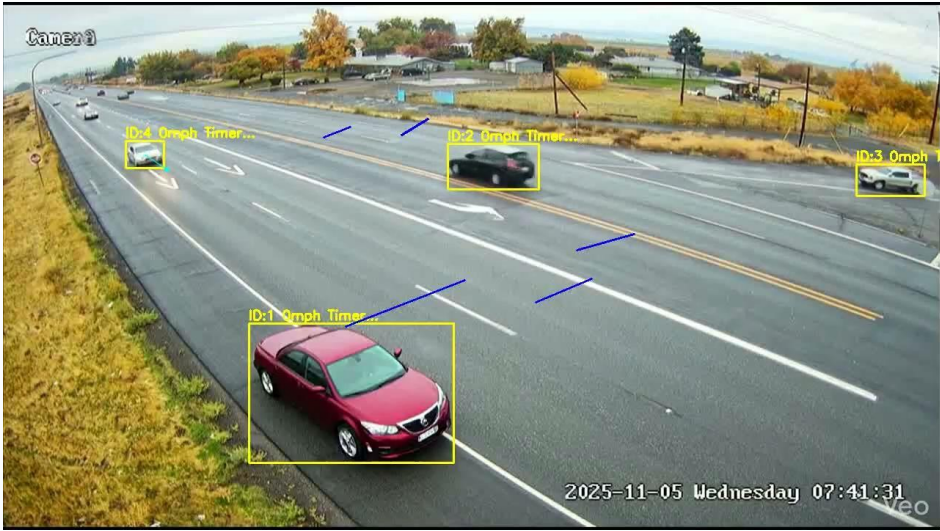
AI Synthetic Data & Anomaly Detection

Collision



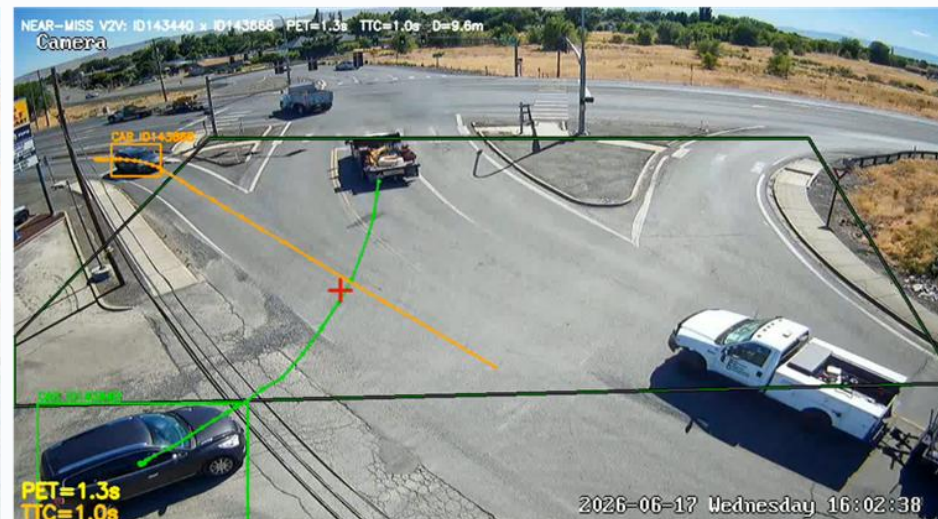
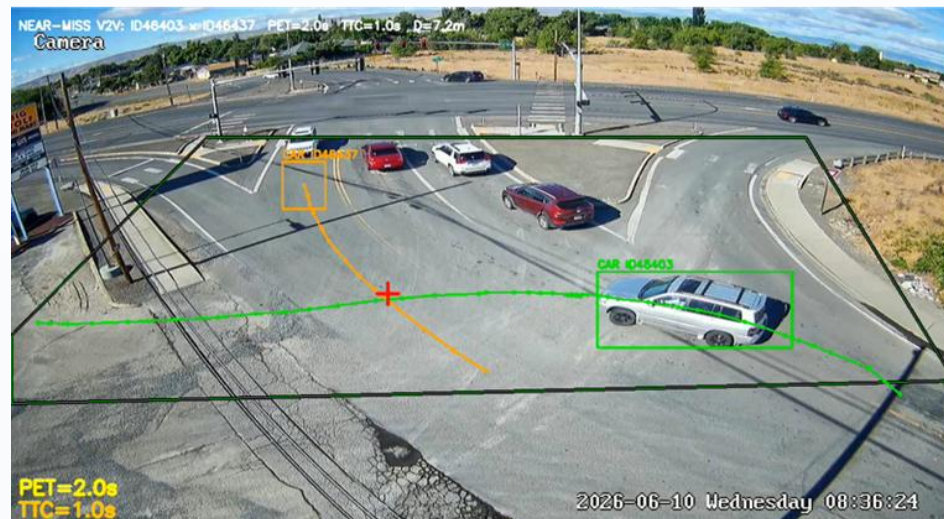
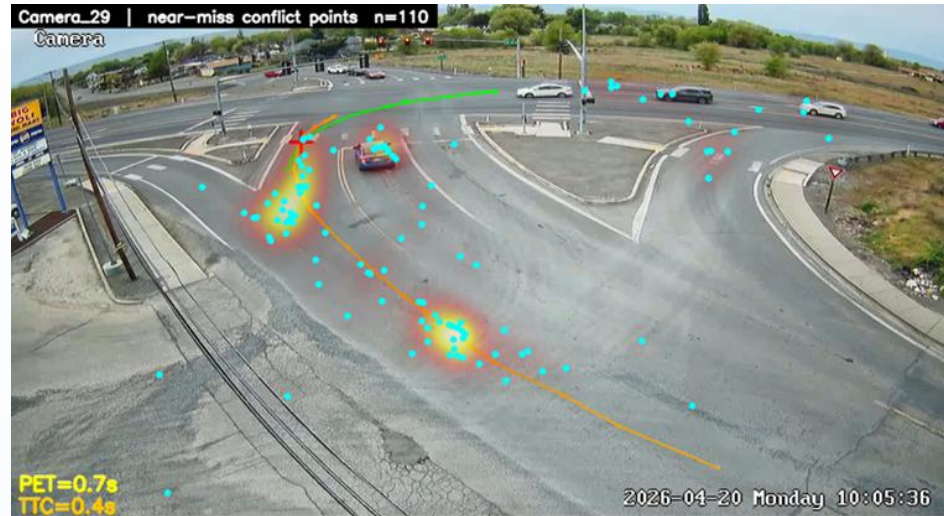
13:35:32 | WARNING | 🚨 [ALERT] Crash | ID:2 | Decel: 14.4->3.9
13:35:33 | WARNING | 🚨 [ALERT] Crash | ID:5 | Decel: 20.3->4.0

Stopped vehicle

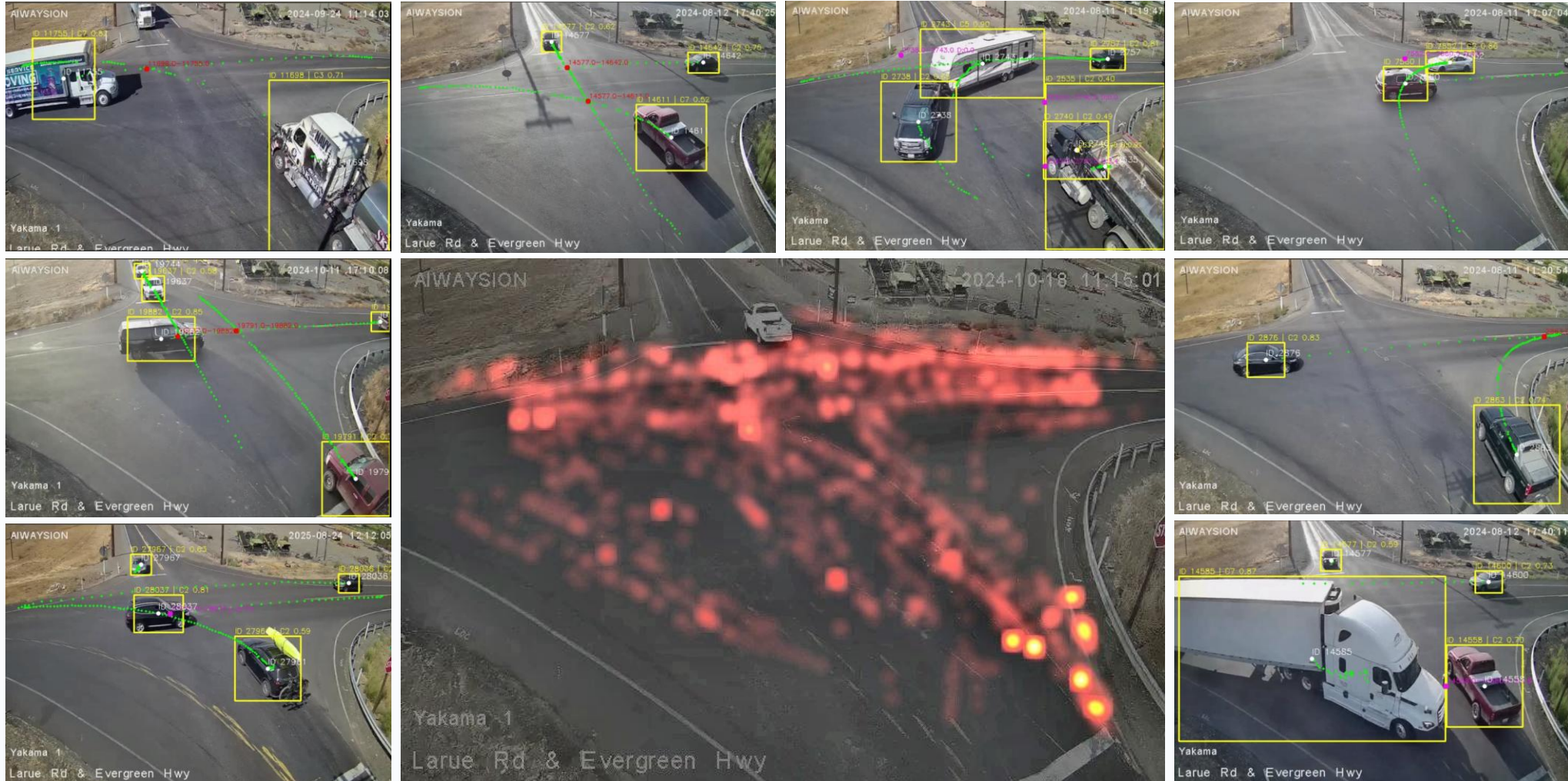


13:39:50 | WARNING | 🚨 [ALERT] Stall | ID:1 | Speed:0.1mph
13:39:50 | WARNING | 🚨 [ALERT] NearMiss | ID:3 | With ID 7

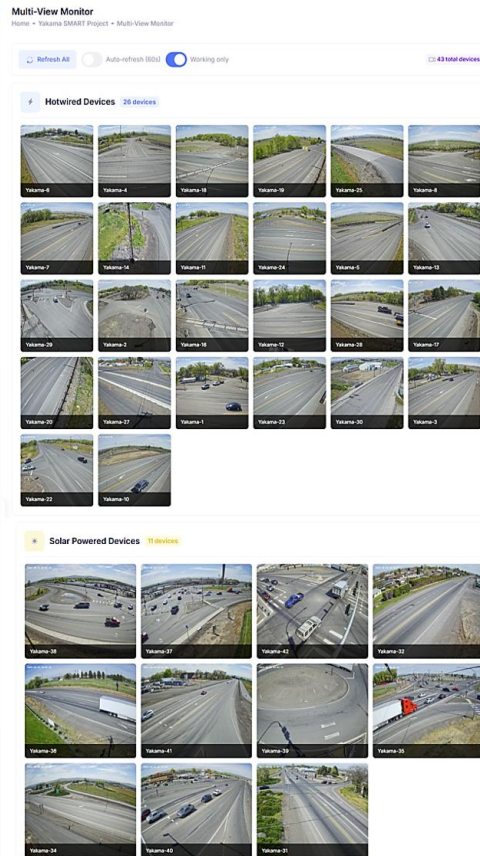
Proactive Safety Analysis



Proactive Safety Analysis



Real-Time Safety Interventions



URGENT: Graffiti Tagging Detected [Summarize](#)

AD AIWaysion Graffiti
To: +11 others
Thu 1/29/2026 10:21 PM

One of AIWaysion's MUST device has detected the following suspected tagging activity.

Details:

- Time: 2026-01-30 06:21:22
- Device Name: I-5_134_01
- Device Location: Pacific Ave to SB I-5
- Tagging Event Location: SB I-705 on ramp to SB I-5
- Geolocation: 47.23388900,-122.43538100



Pacific Ave to SB I-5 — Pacific Ave on ramp to SB I-5 2026-01-29 22:21:20

Notifications via Email, Text Messages, Web Dashboard



Signal Controller, Roadside Message Boards