VWS

Virtual Weigh Stations provide real-time and historical vehicle records for enforcement, traffic surveillance and data collection.

QUARTERHILL

FURTHER. FASTER. **SMARTER.**

> "Overloaded vehicles increase pavement damage and life cycle costs by about 30% compared to the cost of the same vehicles with legal loads."
>
> Jorge C. Pais
>
> *Pavement Cost Due to Traffic Overloads,* International Journal of Pavement Engineering (IJPE)

Commercial Vehicle Operations

Flexible Weight , Safety, and Credential Enforcement

Virtual Weigh Station Benefits

An IRD Virtual Weigh Station (VWS) benefits the transportation agency, the trucking industry and the general public.

- Improved commercial vehicle safety

- Protection of pavement and bridge structures against premature damage due to overweight vehicles

- Policing of trucks on secondary roads attempting to bypass main weighing/inspection stations

- Improved identification of potential violators, leading to more efficient enforcement

- Increased capacity to focus on safety issues

- Enhanced data collection to improve road design

Protect Infrastructure

Increased volumes of commercial vehicle traffic is shortening the life of non-primary infrastructure:

- High visibility enforcement on primary roads results in overweight violation rates less than 2%

- Rural and secondary highways typically have low levels of enforcement. Low enforcement results in overweight violation rates often exceeding 25%

- Some trucks will avoid enforcement on primary roads by using alternate routes

- Thinner surfaces on secondary roads are more susceptible to overload damage

- Overloading is common in resource extractive industries such as mining, energy, and forestry - industries which utilize rural infrastructure

- Overloaded trucks damage bridges and roadways, costing between $0.08 to $2.50 per ton-mile, depending on vehicle weight

Secondary highways and bridges
Weight Monitoring and Infrastructure Protection
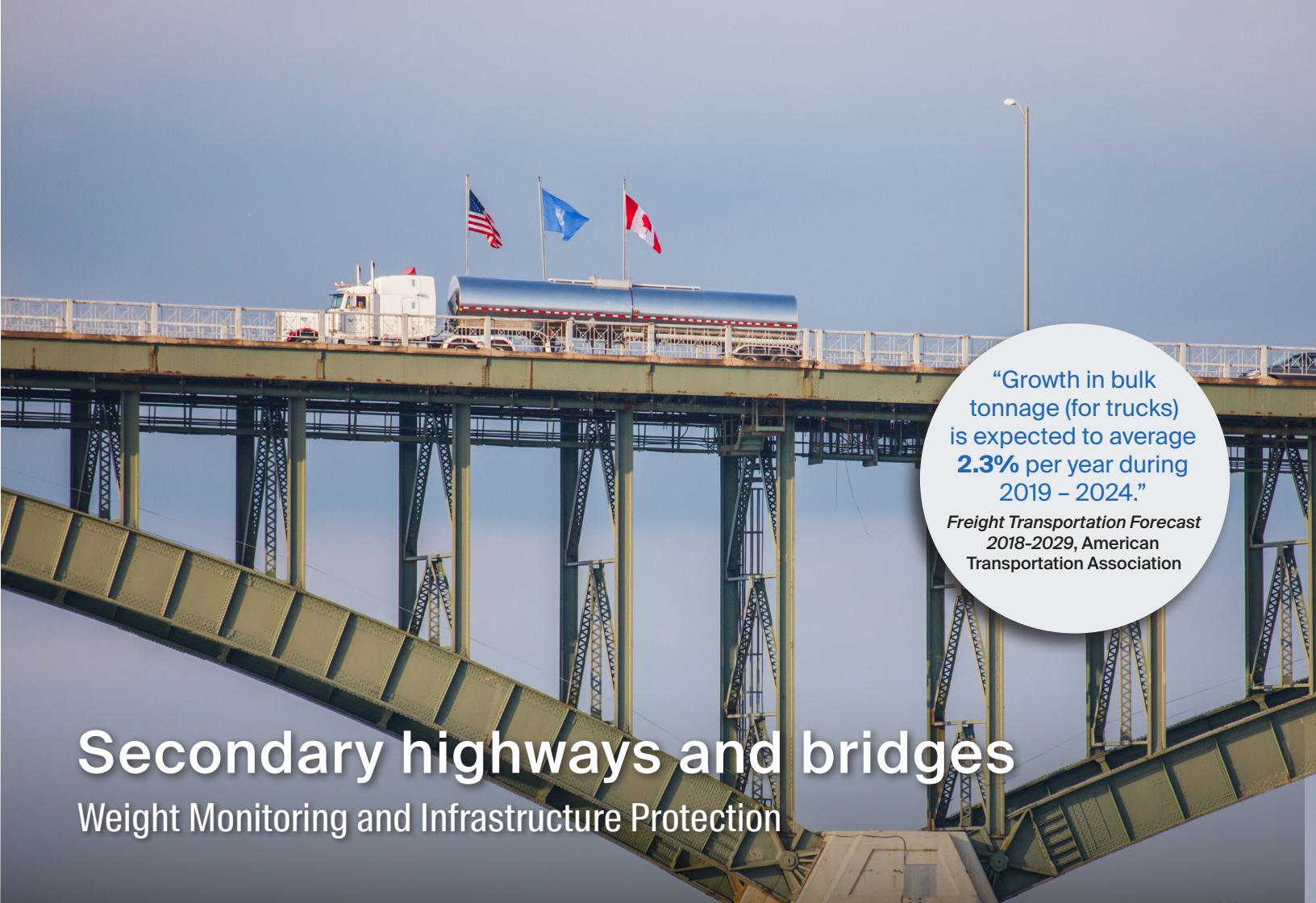
> "Growth in bulk tonnage (for trucks) is expected to average **2.3%** per year during 2019 – 2024."
> *Freight Transportation Forecast 2018-2029*, American Transportation Association

Continuous Data Collection

Detect and measure

- Overloaded vehicles are identified
- Truck overview, USDOT, and license plate images provide positive vehicle identification
- Internet-based, high-speed access for real-time and post-audit activities

> "Trucks will continue to dominate the overall freight transportation landscape, accounting for **66%** of total primary tonnage by 2029."
> *Freight Transportation Forecast 2018-2029*, American Transportation Association

Screening

- Vehicle weight and dimensions
- Bridge formula compliance
- Oversize/overweight permit screening
- Credential screening (SAFER, PRISM, IFTA, etc.)
- Tracking and compliance
- Audible, Visual and Email Alerts

Analyze

Enterprise Software & Data Solutions

- Collect and view real-time and historical data/images and visual records
- Standard or customized reports/visualizations may be created based on user-adjustable parameters
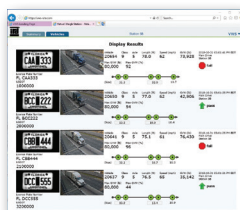
Integrated technologies

Customized solutions utilizing proven and leading edge technology

Core features

WIM (Weigh-in-Motion) Sensors/Scales

- Automatically weigh and classify based on weight, length, and axle spacing
- Perform compliance on all commercial vehicles and flag those in violation to weight regulations
- Screen vehicles at highways speeds (up to 100 mph) and ramp speeds (down to 1 mph)

VWS Software

- Display real-time or historical vehicles and whether they are overweight or violate other screening criteria
- Ability to search and filter the display to the vehicles of interest
- Summary display for vehicle occupancy speed and count for each lane

Sideview Camera

- Capable of both day (color) and night (black and white) operation
- Captures a side view image of the vehicle
- Per vehicle record stores and displays images of each vehicle on the operator workstation

iROC (Intelligent Roadside Operations Computer)

- The iROC Database System receives regular up-dates of the credential information from CVIEW/SAFER and performs the screening operations of commercial vehicles
- Identified vehicles are screened on CVIEW/SAFER data and compared to the set of credential screening rules to determine the credential status of the vehicle
- For historical purposes shows snapshot of the credential and safety data that was used to screen the vehicle at that day/time

iAnalyze®

- Desktop software that facilitates management, analysis and report generation of traffic data collected by IRD Virtual Weigh Station Systems
- Logical user-friendly interface with built-in guides for standard tasks
- Creates traffic data (including WIM) input files for AASHTO's Mechanistic Empirical Pavement Design (MEPDG) software, Pavement ME Design

Options

TACS™ · Tire Anomaly & Classification System

- Detects, screens, and notifies of vehicles with unsafe tires – flat, missing, and mismatched tires
- Detects single, dual, and super-single tire configurations
- Supports screening of vehicles at highway speeds (up to 100 mph) and ramp speeds (down to 1 mph)

LPR (License Plate Reader) & USDOT Reader

- Capture images of license plates - OCR (Optical Character Recognition) technology decodes plate image and jurisdiction for vehicle identification and screening
- Capture images of USDOT Numbers - USDOT numbers are decoded for vehicle/carrier identification. Day or night capture.

Over-Height/Over-Dimension Detection

- Laser scanners and over-height detectors determine vehicle dimensions to determine if commercial vehicles are in compliance with width and height requirements
- Reduce collisions with structures (bridges, overpasses, and tunnels)

AVI (Automatic Vehicle Identification)

- Reliable vehicle identification using transponders for pre-screening and weigh station bypass
- In-cab notification of weigh station bypass

HAZMAT Placard Reader

- Capture images of hazardous material placards and OCR technology automates placard identification
- Detect diamond-shaped placard, HAZMAT class and 4-digit ID (UN/NA number)

VI^{2}M™ (Vehicle Information in Motion) · iMMS

- Web-based Central Repository System combines data from multiple Virtual Weigh Station sites to provide complete picture
- Generation of reports and dashboards
- Access to historical information from numerous sites
- iMMS provides system health information

Virtual Weigh Station software
24/7 Monitoring and enforcement – accessible anywhere

Real-time display

Vehicle Records

- In real-time display mode, the most recent vehicles through the system are displayed

- Each vehicle record displayed will include a thumbnail image of the vehicle and, if equipped with an LPR camera, a license plate image

- Vehicle records include the number of axles, classification, length, speed, gross vehicle weight, maximum allowable gross vehicle weight, a pictogram of the vehicle, and potential violation warnings

- If the lane is equipped with an LPR camera, AVI Tag Reader or USDOT Number Reader, the numbers associated with the vehicle will also be displayed

- If the lane is equipped with a Tire Anomaly & Classification System (TACS™), vehicles with tire safety issues are identified with a tire anomaly alert

Sorting/Signing Decision

- Vehicle records display the sorting decision made by the system. A green arrow with the word "pass" indicates the vehicle is compliant with all regulations and should be allowed to bypass inspection. A red octagon (stop icon with the word "fail") indicates the vehicle may be in violation of one or more screening criteria and should report for inspection

- The VWS system can be configured to control a sign directing vehicles to report for inspection or bypass inspection, similar to conventional weigh station sorter systems

- If a vehicle has a potential violation, the warnings that caused the report decision will be listed at the bottom of the vehicle record

Detailed vehicle record

WIM Results

- The WIM Results tab displays a table of detailed information for individual axles. Information for each axle includes the number of axles, left and right wheel weights, total axle weight, allowable weight, group type, group weight, and group allowable weight

- Weight violations are flagged if any allowable weight limit is exceeded

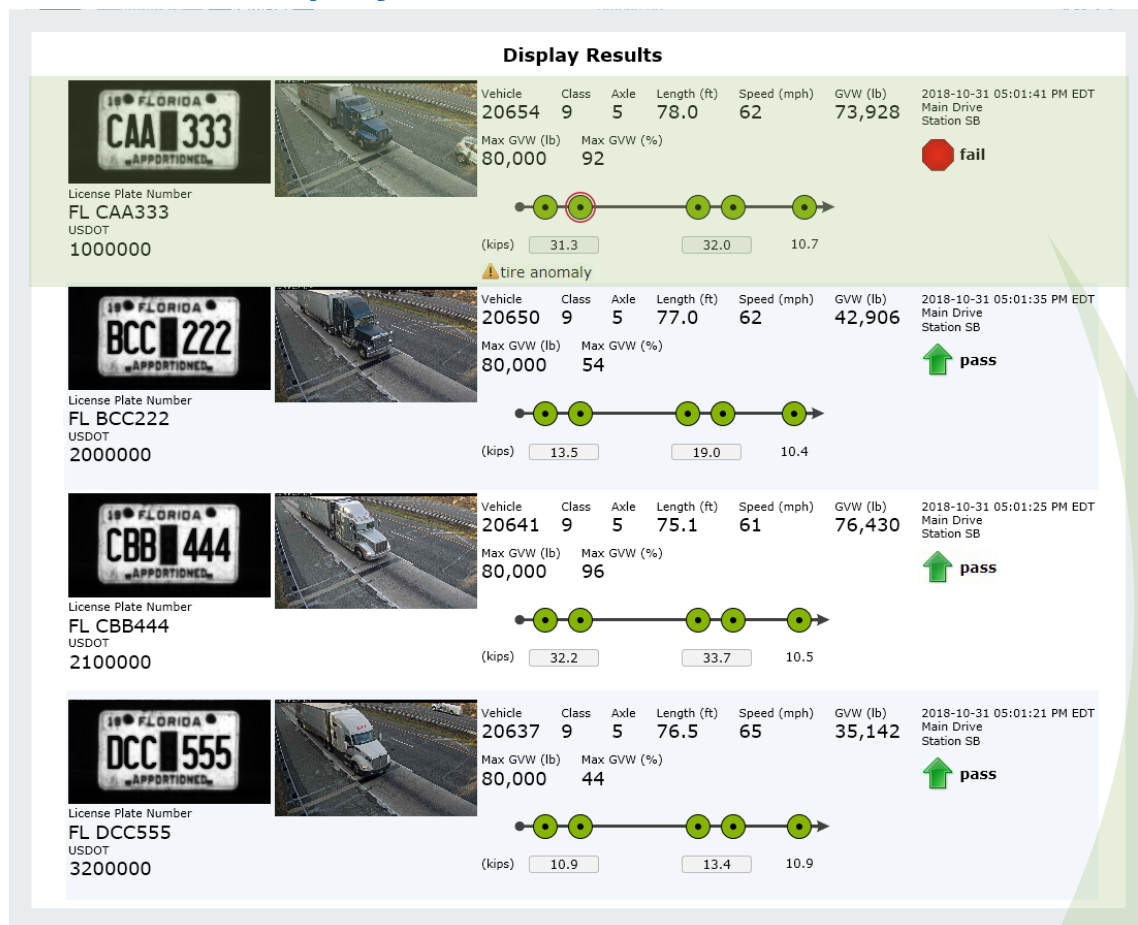### Vehicle/Carrier Snapshot

- If the system is equipped with LPR and/or AVI, and is connected with a regional or national vehicle database, the Vehicle and Carrier Snapshot panels display information from the database and screening results
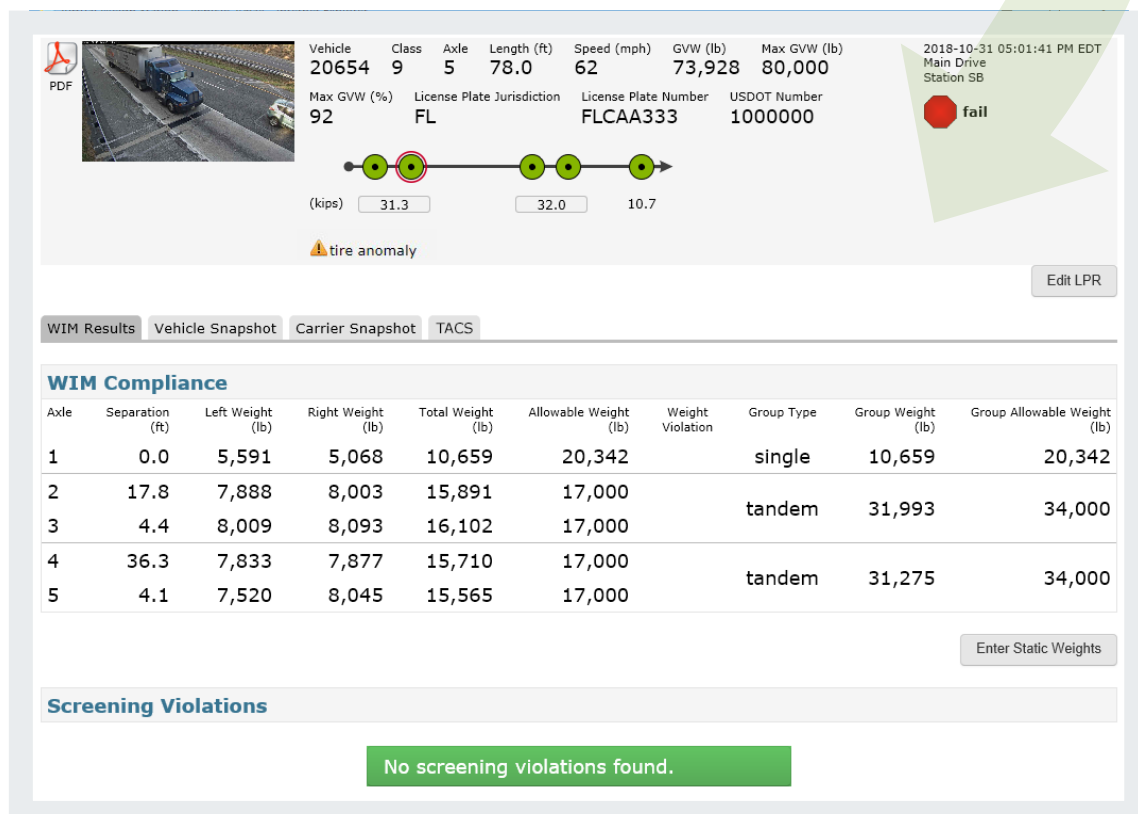
TACS

- The TACS tab displays a pictogram of the vehicle's axles that indicates by shading and color which tires should be inspected for tire anomalies

Real-time display

Display Results

License Plate Number
FL CAA333
USDOT
1000000

Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)
20654	9	5	78.0	62	73,928

2018-10-31 05:01:41 PM EDT
Main Drive
Station SB

Max GVW (lb) **80,000**   Max GVW (%) **92**

🛑 **fail**

(kips) 31.3 32.0 10.7

⚠ tire anomaly

License Plate Number
FL BCC222
USDOT
2000000

Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)
20650	9	5	77.0	62	42,906

2018-10-31 05:01:35 PM EDT
Main Drive
Station SB

Max GVW (lb) **80,000**   Max GVW (%) **54**

⬆ **pass**

(kips) 13.5 19.0 10.4

License Plate Number
FL CBB444
USDOT
2100000

Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)
20641	9	5	75.1	61	76,430

2018-10-31 05:01:25 PM EDT
Main Drive
Station SB

Max GVW (lb) **80,000**   Max GVW (%) **96**

⬆ **pass**

(kips) 32.2 33.7 10.5

License Plate Number
FL DCC555
USDOT
3200000

Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)
20637	9	5	76.5	65	35,142

2018-10-31 05:01:21 PM EDT
Main Drive
Station SB

Max GVW (lb) **80,000**   Max GVW (%) **44**

⬆ **pass**

(kips) 10.9 13.4 10.9

Detailed vehicle record

PDF

Vehicle	Class	Axle	Length (ft)	Speed (mph)	GVW (lb)	Max GVW (lb)
20654	9	5	78.0	62	73,928	80,000

2018-10-31 05:01:41 PM EDT
Main Drive
Station SB

Max GVW (%)	License Plate Jurisdiction	License Plate Number	USDOT Number
92	FL	FLCAA333	1000000

🛑 **fail**

(kips) 31.3 32.0 10.7

⚠ tire anomaly

[Edit LPR]

WIM Results | Vehicle Snapshot | Carrier Snapshot | TACS

WIM Compliance

Axle	Separation (ft)	Left Weight (lb)	Right Weight (lb)	Total Weight (lb)	Allowable Weight (lb)	Weight Violation	Group Type	Group Weight (lb)	Group Allowable Weight (lb)
1	0.0	5,591	5,068	10,659	20,342		single	10,659	20,342
2	17.8	7,888	8,003	15,891	17,000				
3	4.4	8,009	8,093	16,102	17,000		tandem	31,993	34,000
4	36.3	7,833	7,877	15,710	17,000				
5	4.1	7,520	8,045	15,565	17,000		tandem	31,275	34,000

[Enter Static Weights]

Screening Violations

No screening violations found.

Commercial Vehicle Enforcement
Integrated solutions using VectorSense® tire sensor suite—
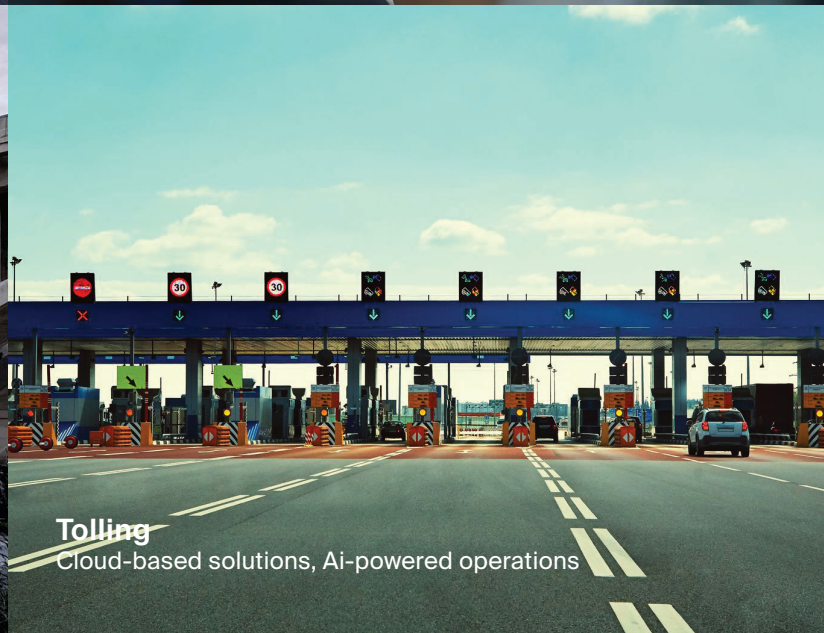tomorrow's sensor technology today

Traffic data solutions
Cloud-based data collection, reporting and analysis

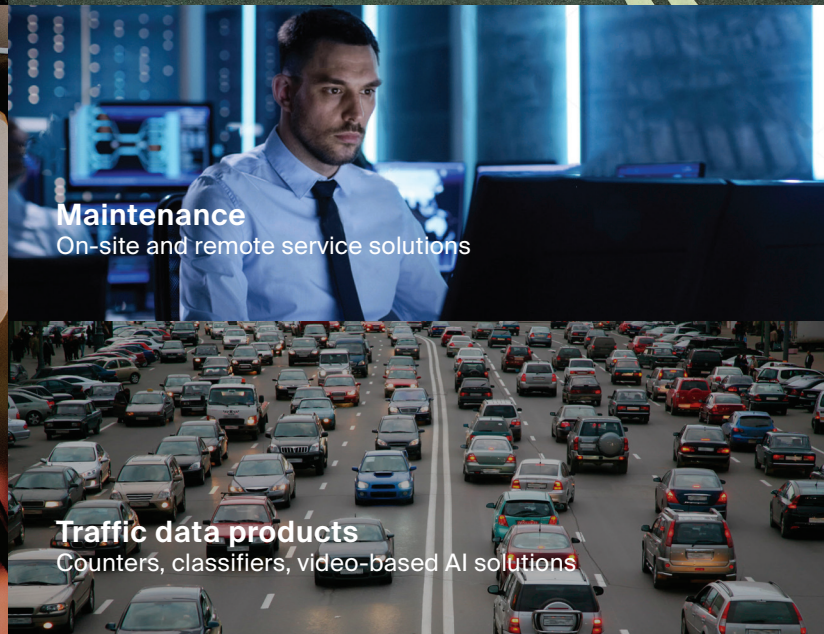**Bridge Protection**
Infrastructure monitoring and safety

Tolling
Cloud-based solutions, Ai-powered operations

Border Systems and Access Control
Efficient cross-border protection. Automated traffic detection.

Maintenance
On-site and remote service solutions

Traffic data products
Counters, classifiers, video-based AI solutions

QUARTERHILL
www.quarterhill.com | info@quarterhill.com

240408-H

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