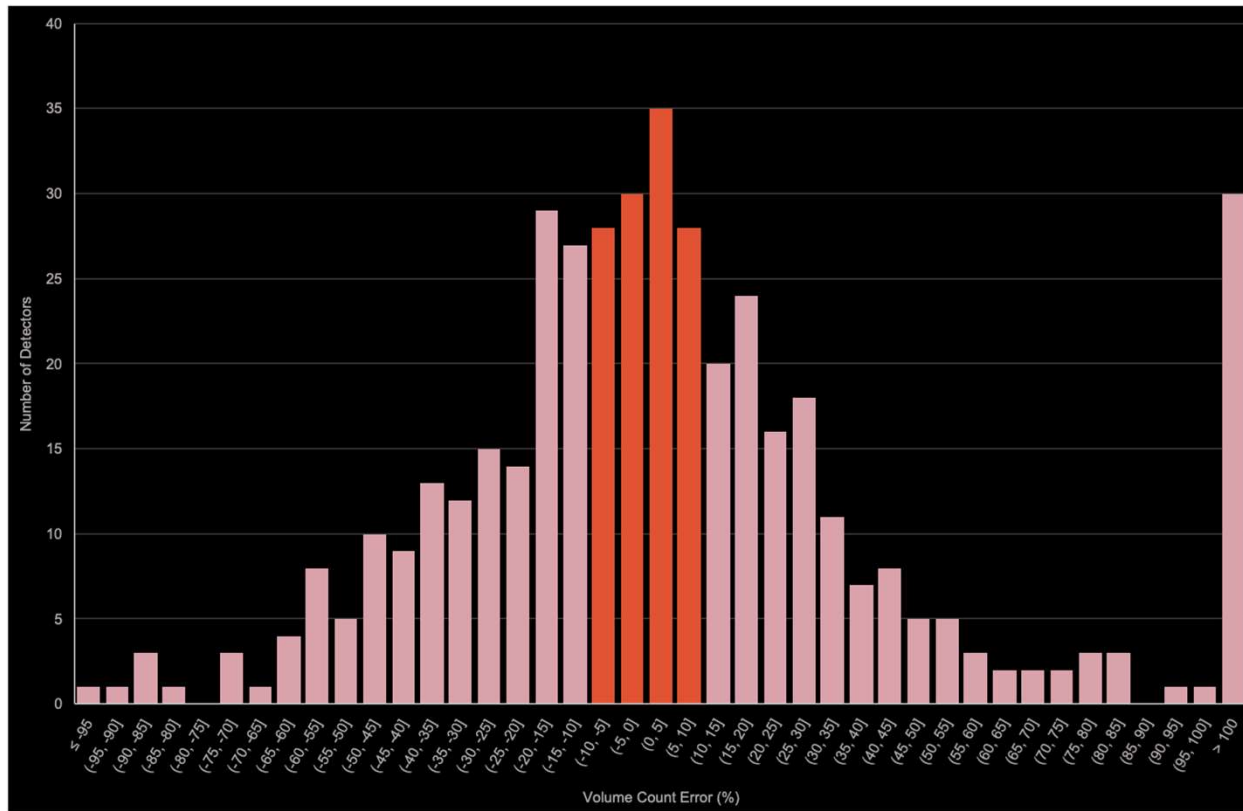# Turning Reactive into Proactive: Using Better Performance Measures for Better Signal Performance

ITS Heartland Annual Meeting, May 2024

Bad data = bad outcomes

- Over 435 detectors studied over a 1-month period
- Only **27.6% of detectors were found to be reliable** (within 10% volume count error)
- Causes false alarms, and **83% of signal issues are missed**
- Reduces trust, increases fieldwork
- Makes all the systems that use them fail

We capture data from up to 35% of vehicles on any given roadway at any given time

The Flow Labs data partner network spans OEMs, GPS device manufacturers, Location-Based Services (LBS) providers, and telematics providers - capturing data from 20-35% of vehicles on any given roadway at any given time.

OEM Data

Our network of OEM partners provides us with access to highly granular data on vehicle locations typically with penetration rates of 3-10% across the US.

Selected Examples: Ford VOLVO gm

Smartphone Data

Data from smartphones and Location Based Services (LBS) can provide key insights on pedestrians, and bicycles as well as vehicles.

Selected Examples: AIRSAGE

GPS Data

We collect data from the tens of millions of GPS devices or on-board GPS systems with penetration rates of 20-35%.

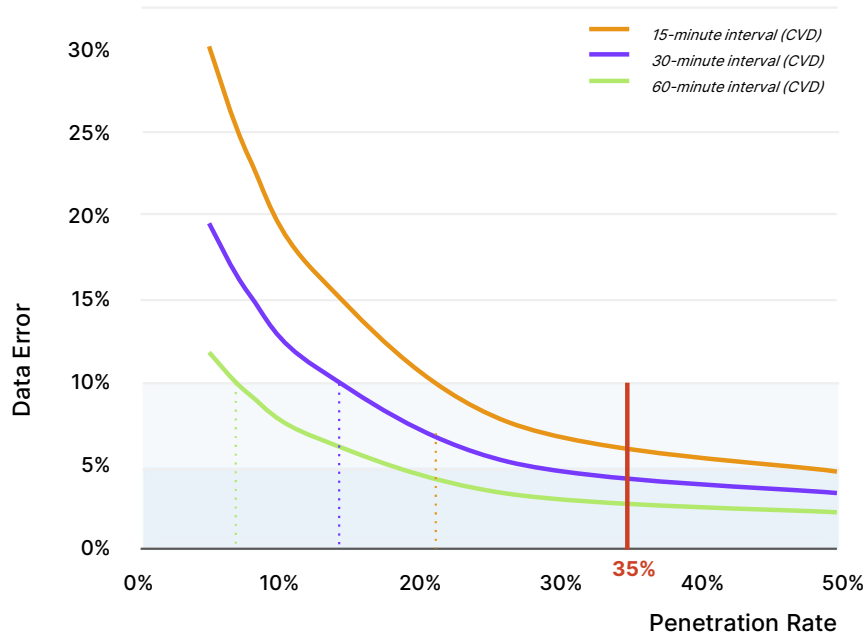**Selected Examples:** tomtom

Telematics Data

We capture data from onboard telematics units which currently have penetration rates of 10-20%.

Selected Examples: MICHELIN arity

Market-leading Connected Vehicle Data (CVD) penetration rates maximize data accuracy

Bigger Data is Better Data

● Higher penetration rates are required to deliver the accuracy levels required for many mission-critical applications.

● Higher penetration data is necessary to achieve accuracy at 15-minute interval levels.

● The Flow platform offers penetration rates of up to 40%, enabling our users to achieve the highest levels of accuracy with connected vehicle data.

Flow Labs

Probe-Based Signal Performance Measures gives insights regardless of connectivity & infrastructure

Signal Operations

Arrivals on Green

Arrivals on Red

Control Delay

Queue Length

Split Failures

Turning Movement Counts

Mobility

Travel Times

Travel Time Reliability

Control Delay

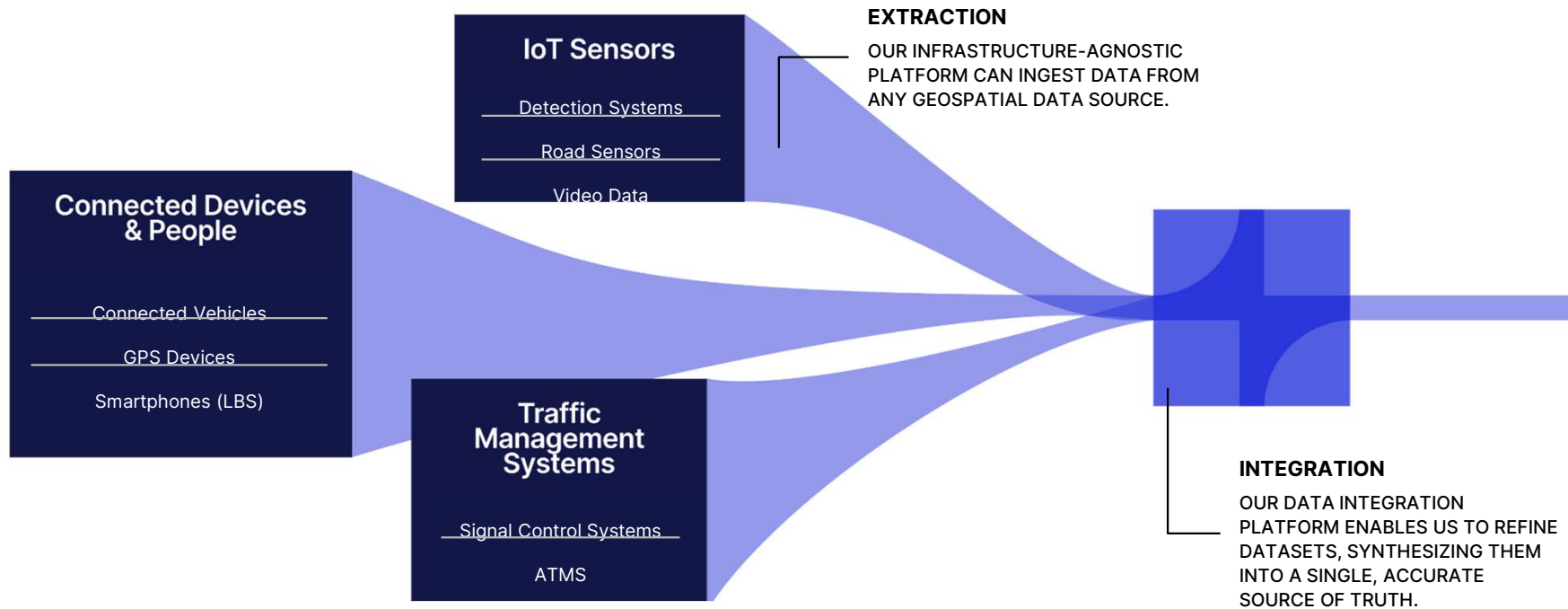Number of Stops

Vehicle Miles Traveled

Cost of Delay

Safety

Speeding & Approach Speed

Hard Braking

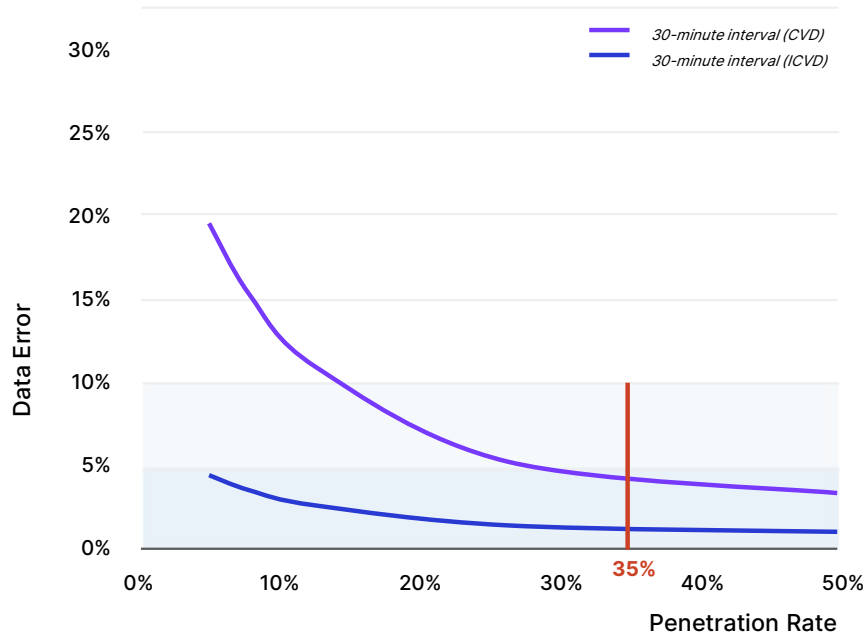Crash & Fatality Incidence

Distracted Driving

Suspected Collisions

Sustainability

Vehicle Emissions

Fuel Consumption

Our Data Integration platform integrates data from any geospatial data source

IoT Sensors

Detection Systems

Road Sensors

Video Data

Connected Devices & People

Connected Vehicles

GPS Devices

Smartphones (LBS)

Traffic Management Systems

Signal Control Systems

ATMS

EXTRACTION

OUR INFRASTRUCTURE-AGNOSTIC PLATFORM CAN INGEST DATA FROM ANY GEOSPATIAL DATA SOURCE.

INTEGRATION

OUR DATA INTEGRATION PLATFORM ENABLES US TO REFINE DATASETS, SYNTHESIZING THEM INTO A SINGLE, ACCURATE SOURCE OF TRUTH.

Only Integrated Connected Vehicle Data (ICVD) offers the accuracy required for mission-critical applications

30-minute interval (CVD)
30-minute interval (ICVD)

Data Error

Penetration Rate

30%
25%
20%
15%
10%
5%
0%

0% 10% 20% 30% **35%** 40% 50%

Integrated Data is Better Data

● Integrating connected vehicle data with other datasets (including from ITS devices) to generate Integrated Connected Vehicle Data (ICVD) achieves the highest levels of accuracy, reducing data error by a further 75%.

● Through generating 95%+ accurate data ICVD offers the capability to support mission-critical, real-time applications.

Flow Labs

Integrated Signal Performance Measures offers the most insights available today

Signal Operations

Arrivals on Green

Arrivals on Red

Control Delay

Queue Length

Split Failures

Turning Movement Counts

Signal Timing

Phase Terminations

Mobility

Travel Times

Travel Time Reliability

Control Delay

Number of Stops

Vehicle Miles Traveled

Cost of Delay

Safety

Speeding & Approach Speed

Hard Braking

Crash & Fatality Incidence

Distracted Driving

Suspected Collisions

Pedestrian Safety

Dilemma Zone Entry

Red Light Running

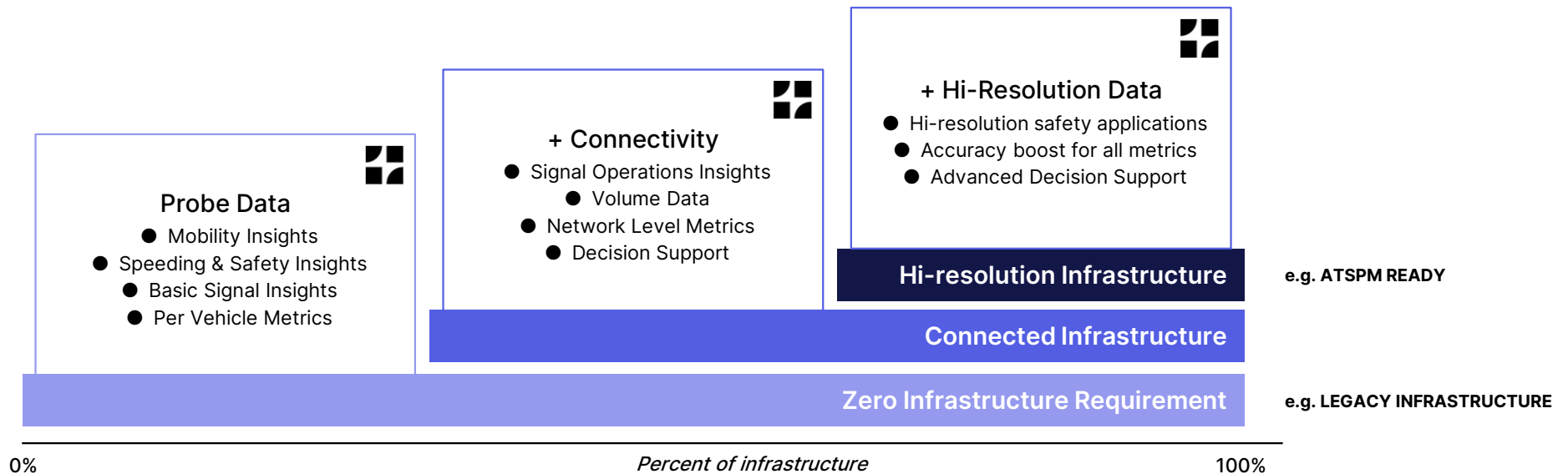## Sustainability

Vehicle Emissions

Fuel Consumption

Integrate all roadway and signal data under a single platform, regardless of existing infrastructure

Every transportation agency has a mix of infrastructure that is constantly evolving. With an infrastructure-agnostic architecture, the Flow Labs platform creates a single digital layer that allows transportation agencies to future-proof their infrastructure.

+ Hi-Resolution Data
- Hi-resolution safety applications
- Accuracy boost for all metrics
- Advanced Decision Support

+ Connectivity
- Signal Operations Insights
- Volume Data
- Network Level Metrics
- Decision Support

Probe Data
- Mobility Insights
- Speeding & Safety Insights
- Basic Signal Insights
- Per Vehicle Metrics

Hi-resolution Infrastructure	**e.g. ATSPM READY**
Connected Infrastructure	
Zero Infrastructure Requirement	**e.g. LEGACY INFRASTRUCTURE**

0%   *Percent of infrastructure*   100%

Flow Labs

A full end-to-end SPM platform for all traffic signal management needs

Our Traffic Signal Management solutions enable engineering teams to monitor, analyze, and optimize traffic signals with ease.

- **Combine Probe-Based SPMs & ATSPMs all in one place.** Use probe data to validate the accuracy of ATSPMs or supplement where ATSPMs aren't available or fall short.

- **Traffic Signal Monitoring & Prioritization.** Proactively identify major signal issues and prioritize retimings.

- **Data Collection & Analysis.** Leverage connected vehicle data and SPMs to analyze and diagnose signal issues. Generate health scores to prioritize intersection issues across corridors or the whole region.

- **Before-After Analysis & Reporting.** Quickly quantify retiming impacts and generate customizable reports instantly.

- **Signal Optimization.** Instantly optimize splits, cycles, and offsets for even the most complex corridors.

Probe Data unlocks Real Time Signal Performance Measures

- **Deploy** real time SPMs to get minute-by-minute data on signal performance without any connectivity to the signals.

- **Prioritize** resolving abnormal traffic issues by getting real time alerts when congestion is outside the threshold of normal.

- **Visualize** real time conditions compared to historical trends without needing to change systems or screens.

[Demo](#)
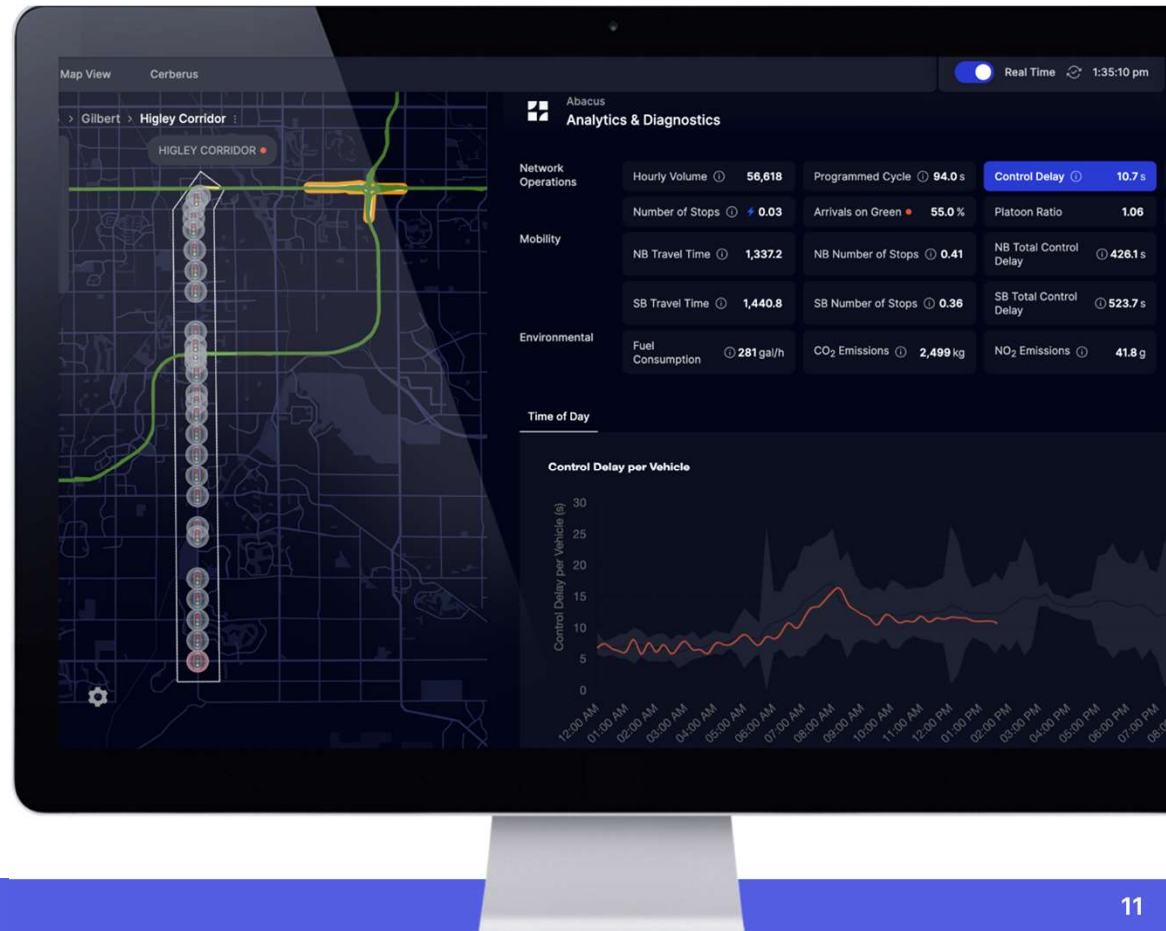
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