

FLEETZERO INSIGHT: PREDICTIVE BATTERY INTELLIGENCE

Predictive Maintenance with Digital Twins Presented by: NextStop Charge

Date: October 24th, 2025





**\$75,000 PER
BATTERY FAILURE**

**\$65K REPLACEMENT
& \$10K DOWNTIME**

USER STORIES

OPERATIONS MANAGER:

User Insights:

- Goal: Plan maintenance early
- Problem: Failures cause costly delays
- AI + Twin: Predicts 2–3 weeks in advance
- Impact: 20% cost reduction

MAINTENANCE ENGINEER:

User Insights:

- Goal: Fix before failure
- Problem: Relies on manual inspection
- AI + Twin: Detects early degradation
- Impact: 25% less repair time

DIGITAL TWIN OPERATOR:

User Insights:

- Goal: Improve prediction accuracy
- Problem: Models lose accuracy without updates
- AI + Twin: Syncs virtual & real data
- Impact: Smarter models over time

DRIVER:

User Insights:

- Goal: Drive confidently mid-route
- Problem: Limited range visibility
- AI + Twin: Gives real-time range + alerts
- Impact: Safer trips, fewer stoppages

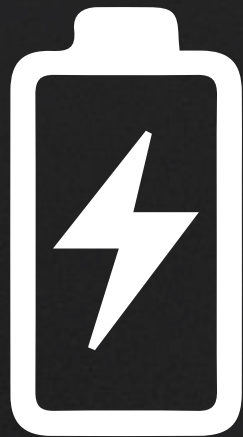
OUR SOLUTION

NextStop Predict

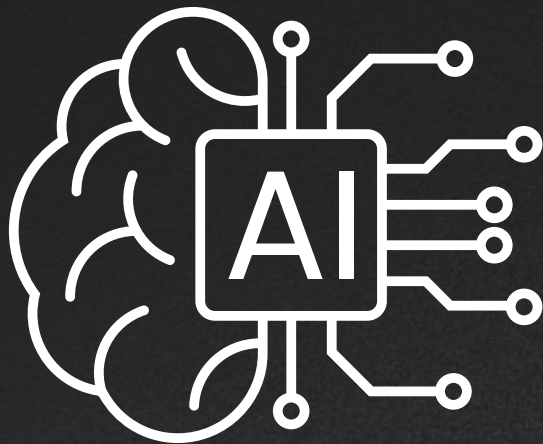
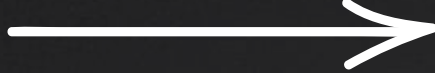
Predict battery failures before they happen.



Real-time Data from Fleet



Digital Twin Simulation



AI Prediction & Insights

INDUSTRY PROOF

Global leaders trust predictive maintenance AI

- Intangles — 95% accuracy
- Stratio — 20% fewer breakdowns
- Proven globally. Now adapted for Toronto.

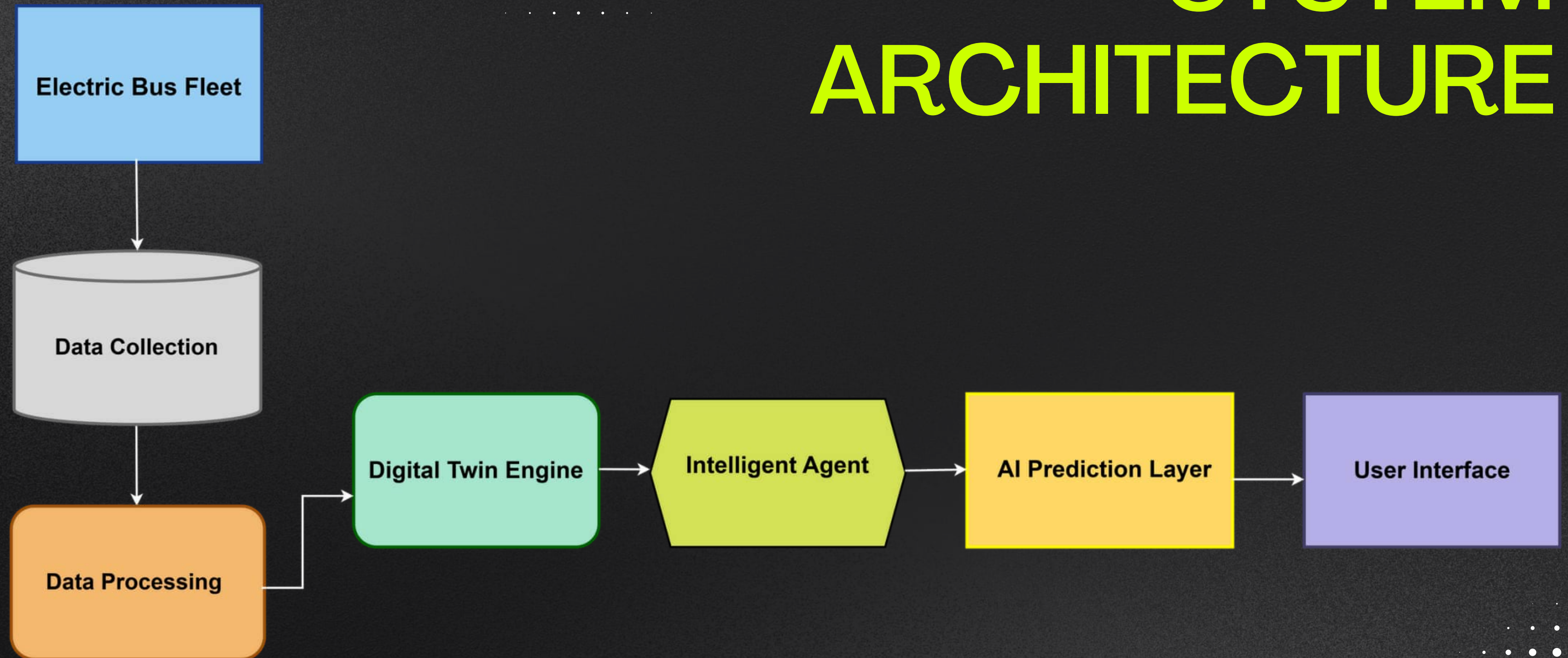


INTANGLES
A DIGITAL TWIN COMPANY

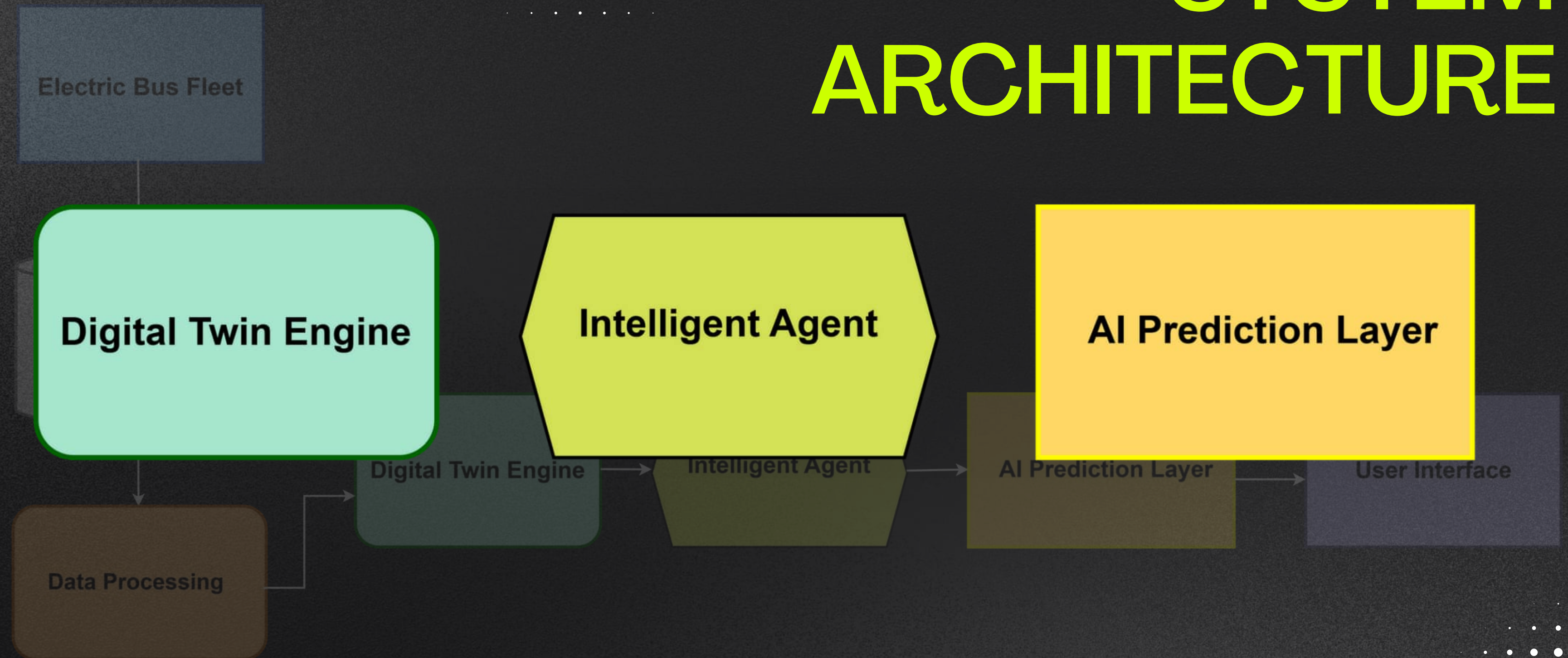


stratio
AUTOMOTIVE

SYSTEM ARCHITECTURE

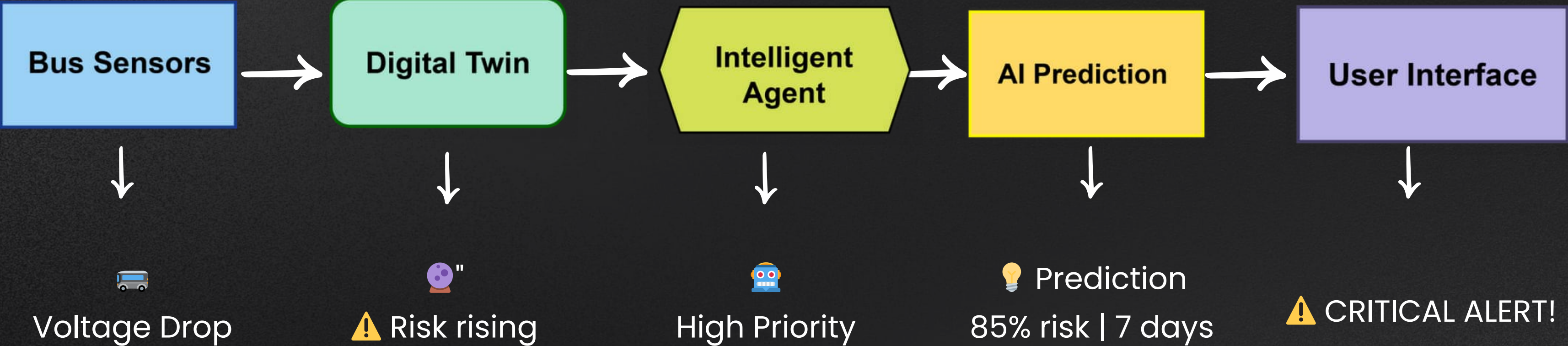
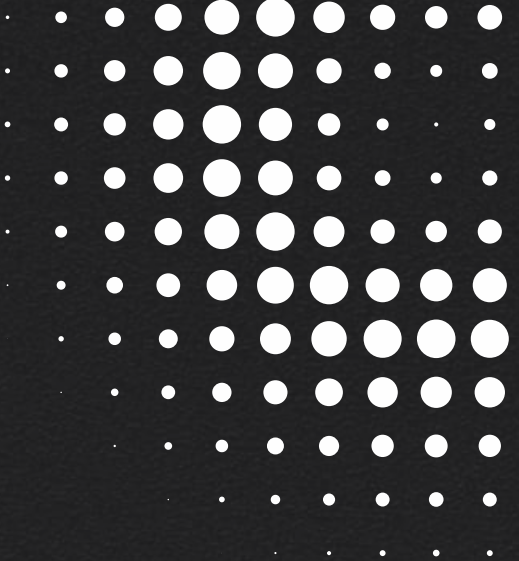


SYSTEM ARCHITECTURE



Real-World Data Flow

Bus 103, Winter Morning, -15°C



Complete flow: Sensor → Action | Fully Automated | 24/7 for 100 buses

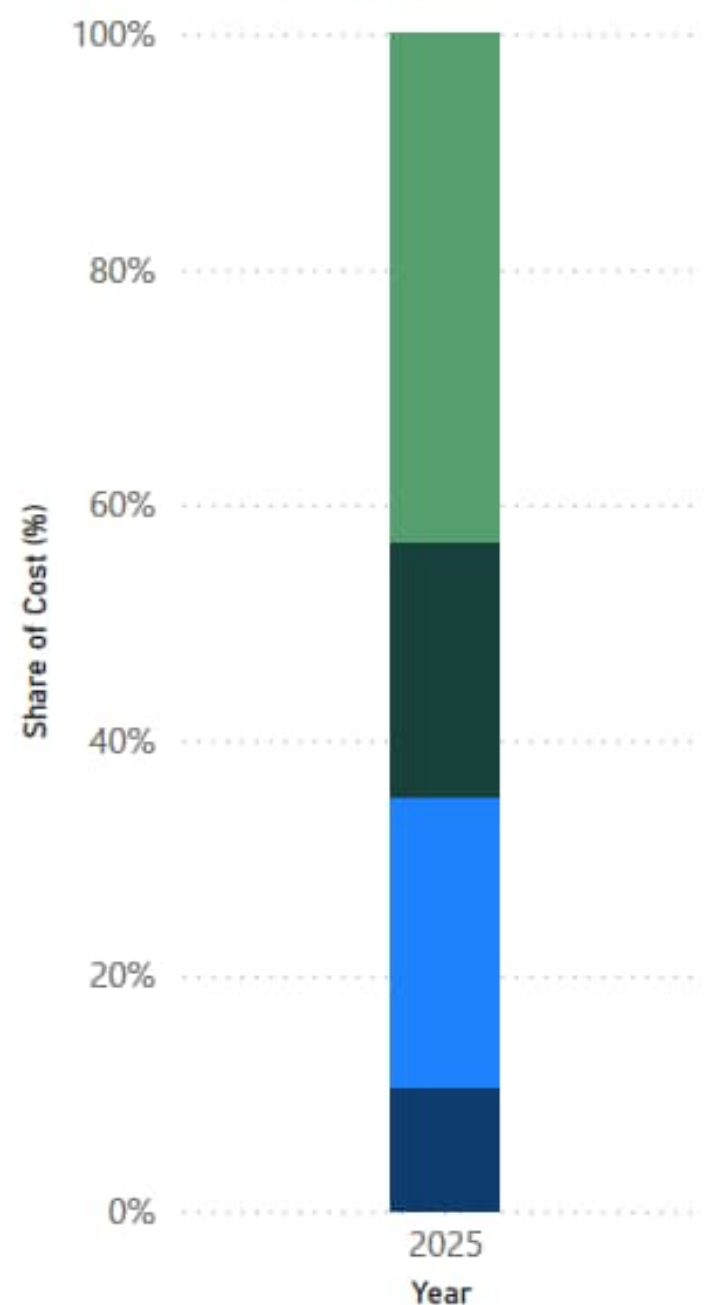
1.54M → 512.81K

Baseline Total cost

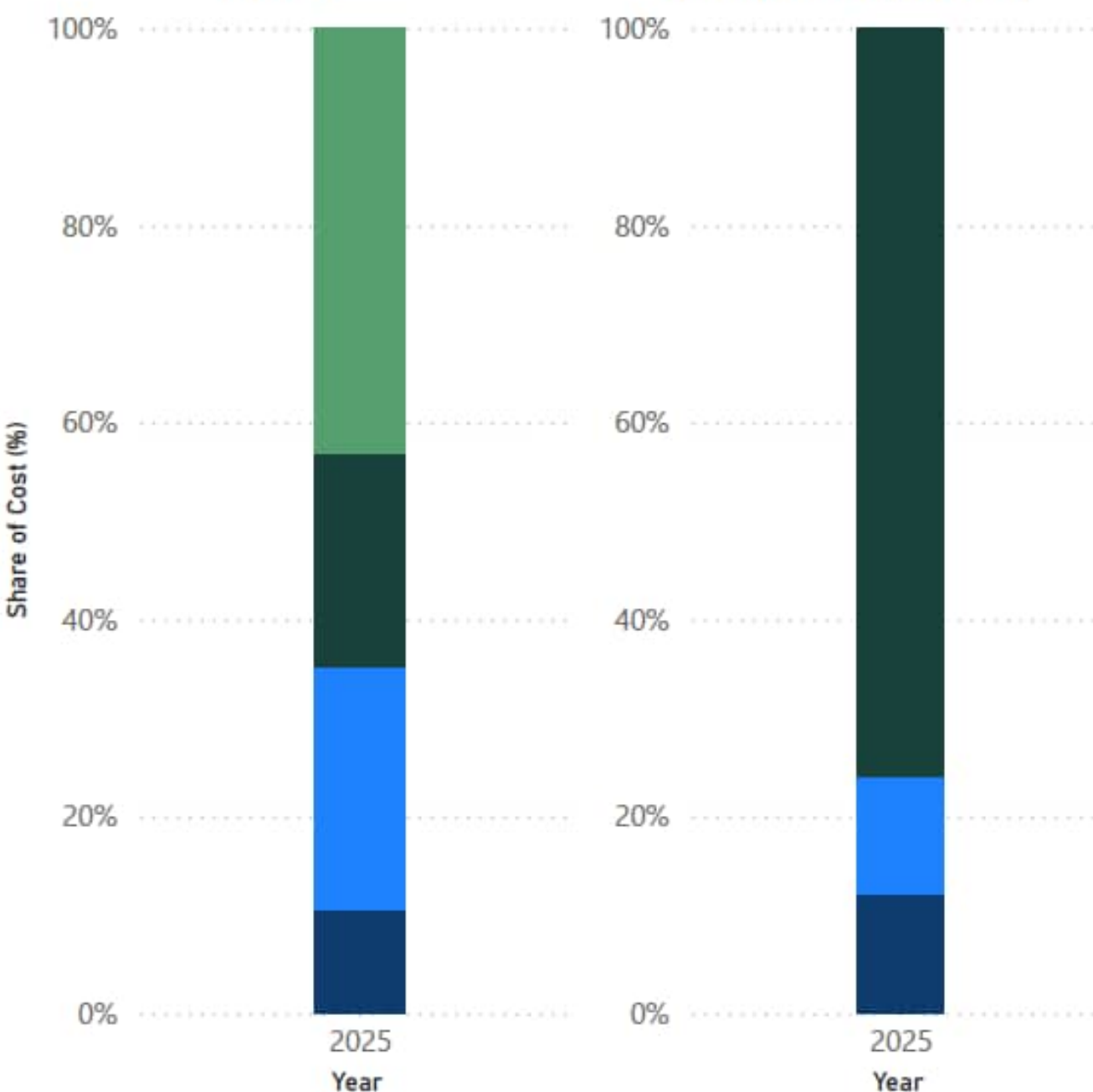
Predictive Total Cost

Reactive vs Predictive: Annual Fleet Cost Comparison

Baseline Cost Composition
(2025)



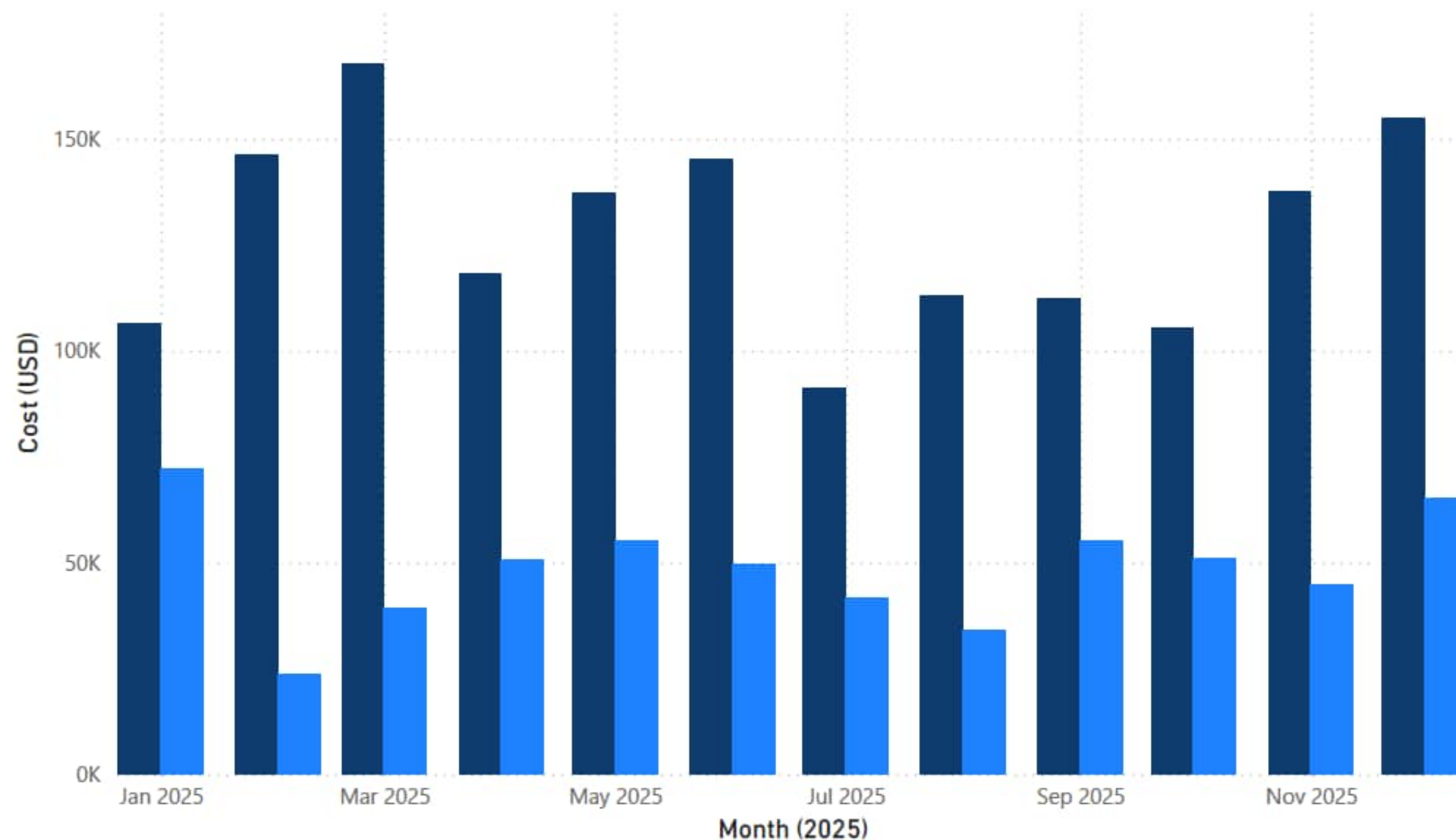
Predictive Cost
Composition (2025)



● Towing ● LostService ● Labor ● Parts ● Planned ● Program ● Unplanned...

Monthly Cost — Reactive vs Predictive

● Sum of TotalCost ● Sum of TotalCostWithProgram



FLEET OPERATOR DASHBOARD

THE TRANSPORTATION INNOVATION JAM

● NEXTSTOP CHARGE 2025

FLEET ZERO

Battery Digital Twin

Real-time Predictive Maintenance System

Active Buses: 10 / 12

System Online

Last updated: 11:00:56 PM

FLEET OPERATOR DASHBOARD

Select Bus:

Bus 101

Bus 102

Bus 103

Bus 104

Bus 105

Bus 106

Bus 107

Bus 108

Bus 109

Bus 110

Bus 111

Bus 112

Overall Fleet Status

Healthy: 42% | Warning: 33% | Critical: 8% | Offline: 17%

CRITICAL ALERT

Live Battery Status - Bus 101

State of Charge (SoC):82%

State of Health (SoH):90%

Voltage:384.2 V

Current:-120 A

Temperature:36 °C

Charge Cycles:1247

AI-Predicted Health Score

88

HEALTHY

Sustainability Impact

CO₂ Saved This Month:1.9 tons

Battery Life Extended:+9%

Fleet Carbon Efficiency:92% electric uptime

Real-time Sensor Data

Cell Voltage Range: 383.7–384.7 V

Max Cell Temp: 42 °C

Internal Resistance: 145 mΩ

Remaining Range: 190 km

DESKTOP SCREEN

MOBILE SCREEN

FLEET ZERO

Battery Digital Twin

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frontend-hackathon-next-stop-station.onrender.com

FLEET OPERATOR DASHBOARD

FLEET ZERO Battery Digital Twin
Real-time Predictive Maintenance System

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Last updated: 11:00:56 PM

FLEET OPERATOR DASHBOARD

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FLEET OPERATOR DASHBOARD

FLEET ZERO

Battery Digital Twin
Real-time Predictive Maintenance System

Active Buses: 10 / 12
System Online
Last updated: 11:00:56 PM

FLEET OPERATOR DASHBOARD

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DASHBOARD

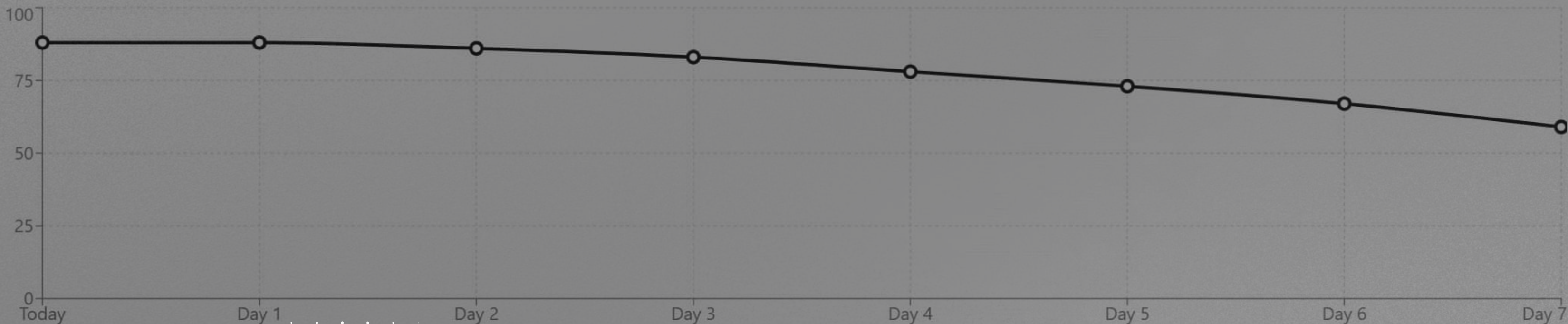
AI Live Alerts

Battery Degradation Detected: Battery health good. Minor degradation expected in 25 days.

Optimization: Normal charging patterns observed.

Insight: Estimated failure risk: Low (10% in next 30 days) ()

AI-Predicted Battery Performance (Next 7 Days)



Schedule Maintenance Now

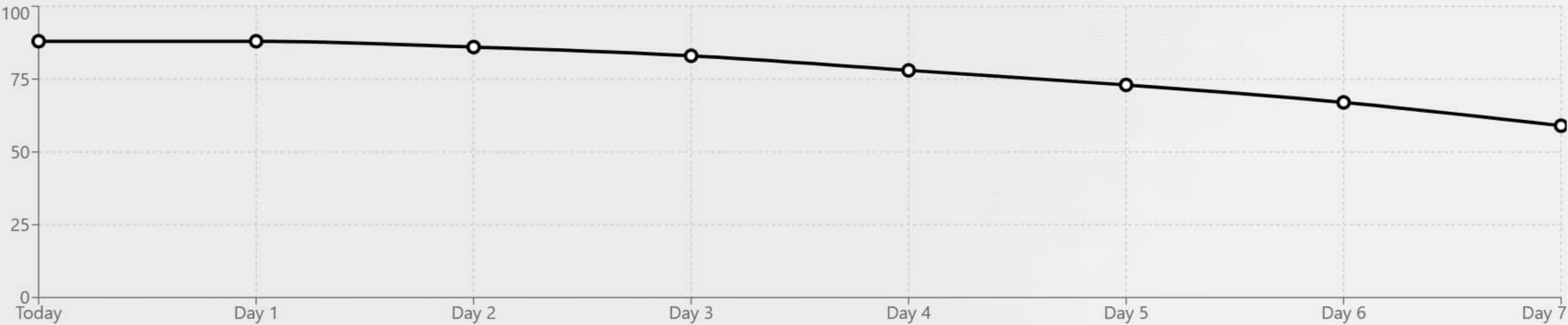
DASHBOARD

THE TRANSPORTATION INNOVATION JAM

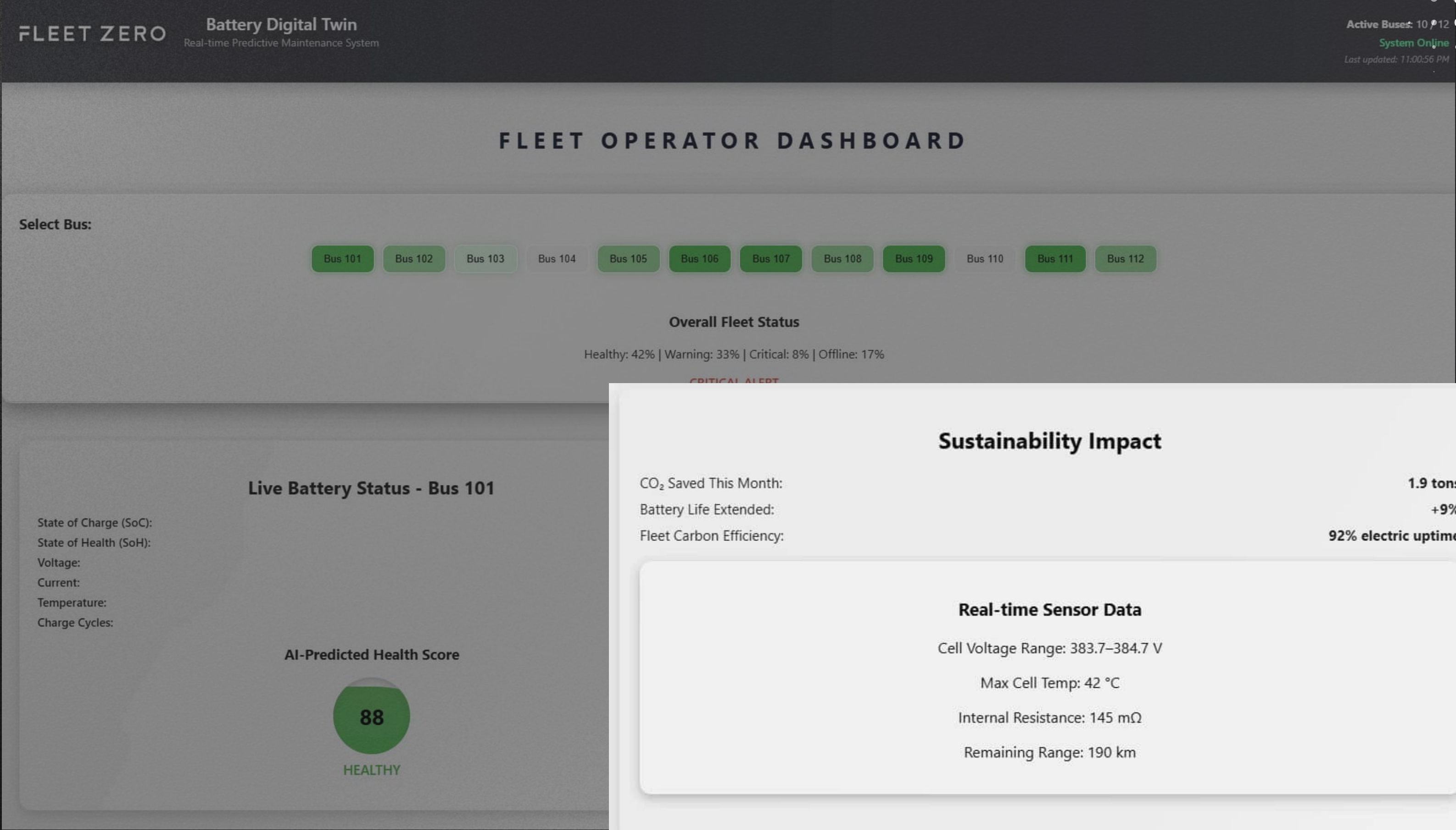
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FLEET OPERATOR DASHBOARD



INDIVIDUAL BUS INTELLIGENCE

THE TRANSPORTATION INNOVATION JAM

● ● ● ● ● NEXTSTOP CHARGE 2025

FLEET ZERO Battery Digital Twin
Real-time Battery Status & Alerts

To exit full screen, press and hold Esc

Bus: Bus 101
System Online
Last updated: 11:17:03 PM

DRIVER VEHICLE MONITOR

Battery Health Status - Bus 101

State of Charge (SoC):
State of Health (SoH):
Charge Cycles:

82%
90%
1247

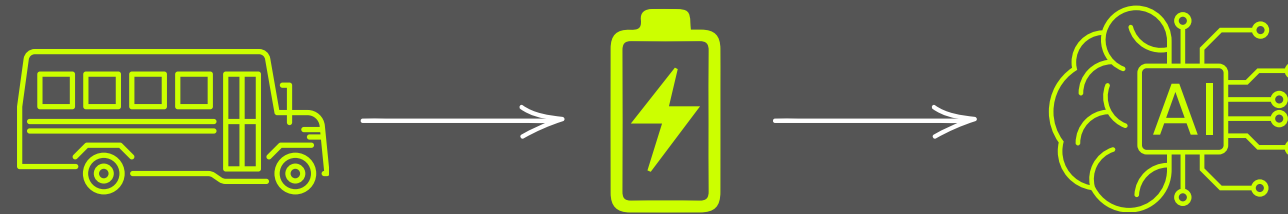
AI-Predicted Health Score



HEALTHY

KEY TAKEAWAYS

What it does::



Cost impact:

≈66.7% reduction

Imagine the Future!

Presented by: NextStop Charge

THANK YOU FOR YOUR ATTENTION

Predictive Maintenance with Digital Twins

Date: October 24th, 2025



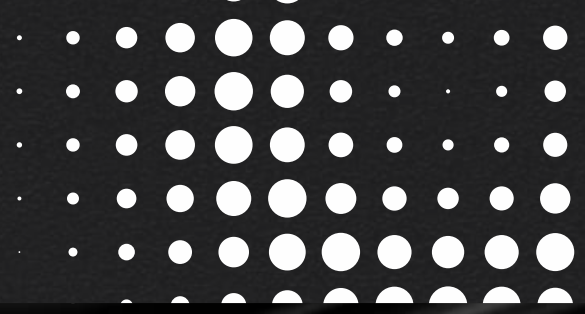
FLEET OPERATOR DASHBOARD








INDIVIDUAL BUS INTELLIGENCE



Why We Need Each Component



Component	The Problem	The Solution
 Bus Sensors	Can't monitor what you can't see	Real-time data every 30 seconds
 Digital Twin	Can't test on real batteries (too risky/costly)	Virtual battery Safe experiments Physics-based
 Agent (LLM)	100 buses × 24/7 = impossible to monitor manually	Automates monitoring Never sleeps
 AI Prediction	Physics doesn't catch all patterns (quirks, defects)	Learns from real failures 95% accuracy
 Dashboard	Intelligence trapped in computers is useless	Humans can see and ACT One-click action