TRANSNOMIS

A Comprehensive and Versatile Bluetooth - Wifi Travel Time System

Introduction and Company Profiles

- Transnomis is Canada-Toronto-based and employs a team of system architect, software developers, QA testers and UI/UX developer

- Clients in Canada and USA

- Recently awarded Edmonton Advance Traffic Management System project

- All hardware and software are developed, tested and manufactured in North America

- Long history of working on Intelligent Transport Systems solutions especially travel time systems.

Hardware Overview

Transnomis Bluetooth Sensor

- Our primary design principles: *Simplicity, Interoperability & Affordability*

- Ministry of Transport MTO approved

- Available in Shelf Mount and in Pole Mount (IP65 waterproof)

- Small and compact

- CSA and UL approved power supply

  – Wide input range (9-36VDC, 120VAC)

  – Protection: Shorting, Over-voltage, Over-temp

- Single Power Over Ethernet (PoE) connection

- Built-in cellular communication (option)

Ministry of Transportation Approved

- Extensively tested for 12 month, 4 season period on MTO Highway 26 test bed

- Eligible for bidding future MTO Bluetooth acquisition tenders

- Sensor and Software validated as meeting industry best practices by 3rd Party consultant.
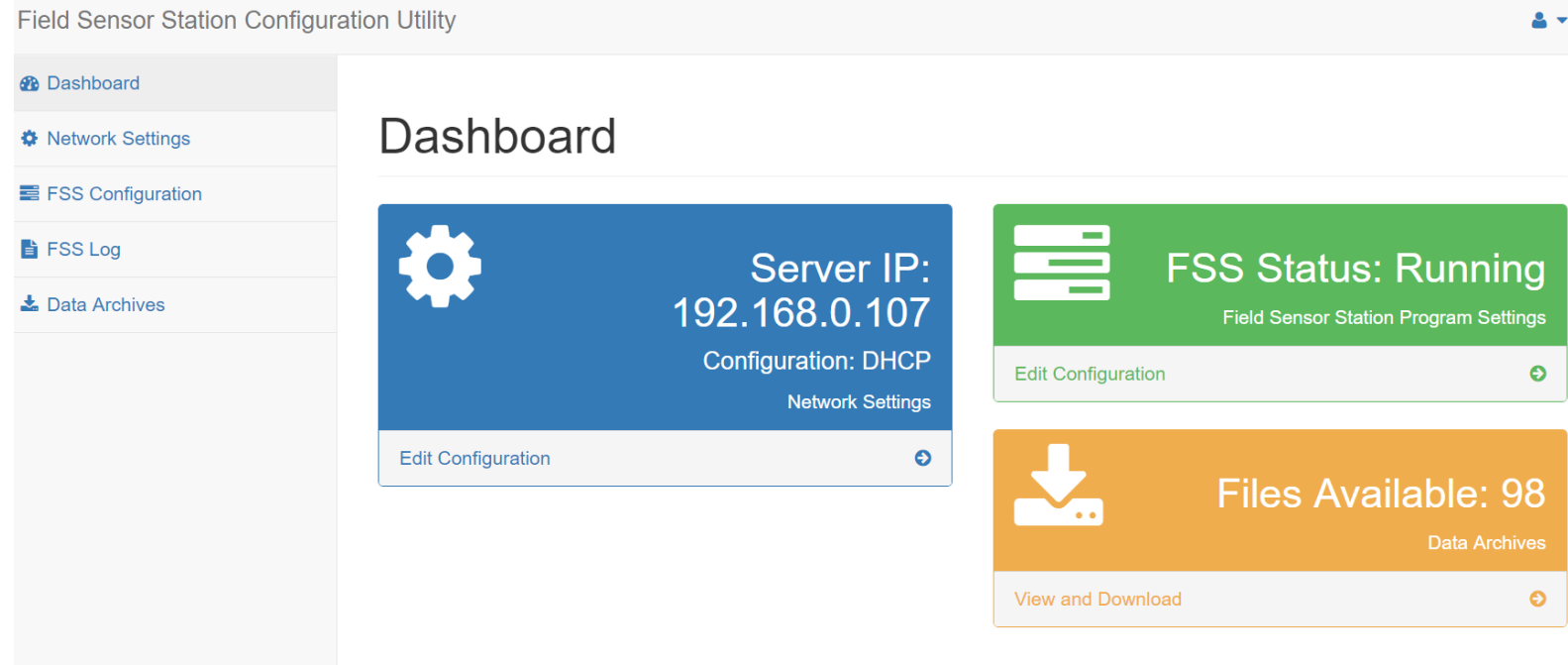
SPECIFICATIONS

Processor	1.2GHz 64-Bit QUAD Core
Measured Item	Bluetooth and WiFi MAC addresses
Timestamp	To nearest milisecond
Memory	1GB DDR-RAM
I/O	High-Speed MicroSD slot (up to 30Mb/s)
	10/100 Ethernet Port
Power Consumption	3W Nominal 6W Max
Input Voltage	PoE (9-36VDC or 802.3at/af with adapter)
Antenna	Omni Directional
Detection Area	Up to 200m
Dimensions	Shelf mount: 6"x 3"x 6" Pole mount: 9"x 12"x 2" (L x W x H)
Weight	Shelf mount: 3lbs Pole mount: 5lbs

Major Hardware & Firmware Features

- Supports multiple detection methods <u>simultaneously</u>
  - Bluetooth discovery
  - Bluetooth Low Energy discovery
  - Bluetooth Low Address Portion (LAP) sniffing
  - WiFi discovery
- Multi-threaded
  - Simultaneous detection of all 4 types
- Asynchronously <u>hashed</u> and <u>timestamped</u> to 16 digits accuracy <u>immediately</u>
- TLS/SSL Encryption for GUI and Data
- Immediate or batch data delivery option
  - Immediate – fastest
  - Batch delivery with compression to lower cell data cost
- Measures device dwell time
- Provides persistence device counts
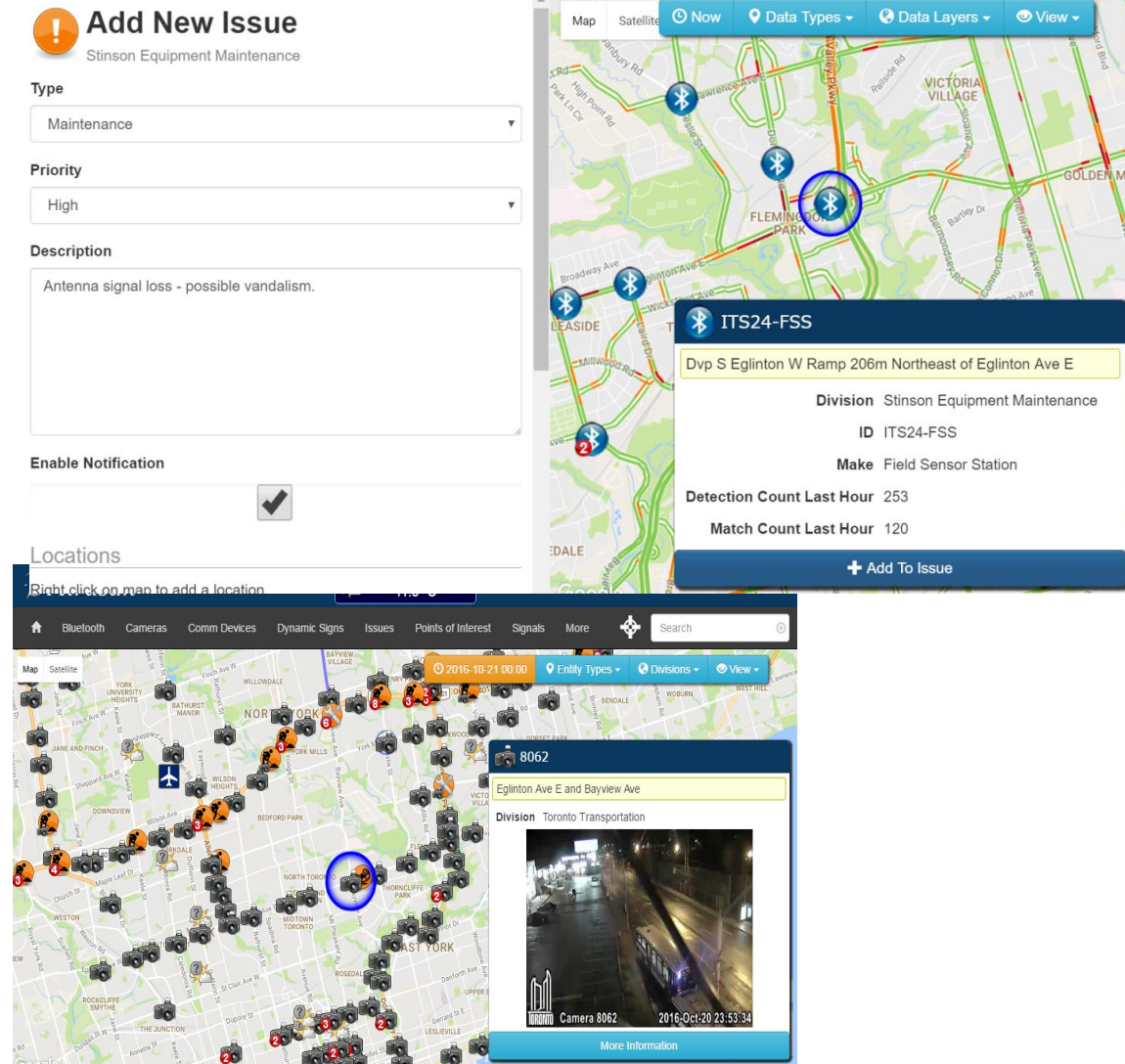
Easy Configuration

- **Web based configuration (any browser, any device)**
  - IP address (static / DHCP)
  - Subnet mask
  - Gateway
  - MAC Hashing – enable/disable, salt

- **Default configs come pre-loaded**
- **Automatically resumes operation**
- **Automatically sync time via NTP on start up and daily**
- **Download data archived / backed up automatically**
- **Firmware upgrade up-to-date**

Field Sensor Station Configuration Utility

- 🎛 Dashboard
- ⚙ Network Settings
- ☰ FSS Configuration
- 📄 FSS Log
- ⬇ Data Archives

Dashboard

⚙ **Server IP:**
192.168.0.107
Configuration: DHCP
Network Settings
Edit Configuration ⊙

FSS Status: Running
Field Sensor Station Program Settings
Edit Configuration ⊙

Files Available: 98
Data Archives
View and Download ⊙

TTMS Overview

- Web and map based GUI
- Built-in GIS engine – no link-by-link config
- Map-based route config
- User-customizable dashboard
- Equipment issue management and report
- Flexible data analysis tool
- Advanced OD report
- Supports both Canadian and US units
- Supports other BT systems and other data types (e.g., camera, RWIS, traffic event…)

Map Based Graphical User Interface

- Web based: any browser, any device

- Automatic colour coded speed indicators
  - No manual drawing
  - No configuration of detector pairs

- Issue notification built into device icon for easy identification

- Historical data viewing. Dial back the clock to see congestion at any point in the past

- Robust search feature to quickly identify a device or issue

- Quickly compare system travel time with Google in real-time
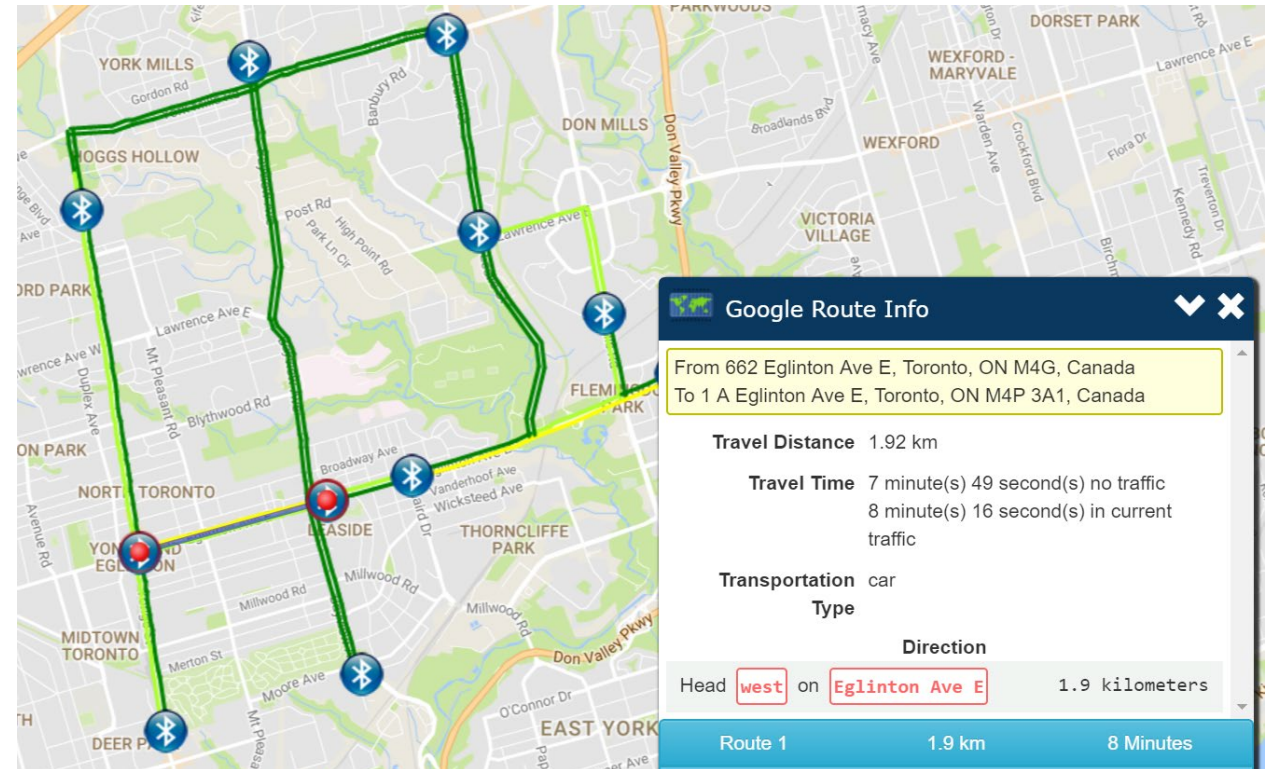
Travel Time – Other Supported Sources

- Google (has cost)

- Waze

- TomTom

- Bus / fleet vehicle GPS

- GPS from mobile app users

- Loops

- Radars

Origin-Destination Report

Origin Destination Report

|			
Start Time	2017-09-16 16:42	End Time	2017-09-17 16:42
Division	Stinson Equipment ▼		

✔ Refresh Table

| Origin \ Destination	Bayview Moore (917)	Bayview YorkM (1064)	Don Mills Barber (831)	Eglinton Bayview (2113)	Eglinton DVP (928)	Eglinton Laird (1630)	Eglinton Yonge (2746)	Leslie Lawrence (1317)	TSI (98)	Yonge Ivor (1634)	Yonge Lawton (1937)	YorkM Leslie (870)
Bayview Moore (812)	-	230 O:28% D:22%	23 O:3% D:3%	122 O:15% D:6%	29 O:4% D:3%	62 O:8% D:4%	117 O:14% D:4%	40 O:5% D:3%	2 O:0% D:2%	57 O:7% D:3%	108 O:13% D:6%	22 O:3% D:3%
Bayview YorkM (1158)	297 O:26% D:32%	-	34 O:3% D:4%	167 O:14% D:8%	18 O:2% D:2%	49 O:4% D:3%	95 O:8% D:3%	92 O:8% D:7%	3 O:0% D:3%	127 O:11% D:8%	67 O:6% D:3%	209 O:18% D:24%
Don Mills Barber (766)	29 O:4% D:3%	34 O:4% D:3%	-	111 O:14% D:5%	146 O:19% D:16%	111 O:14% D:7%	49 O:6% D:2%	157 O:20% D:12%	13 O:2% D:13%	24 O:3% D:1%	27 O:4% D:1%	65 O:8% D:7%
Eglinton Bayview (1878)	127 O:7% D:14%	163 O:9% D:15%	65 O:3% D:8%	-	230 O:12% D:25%	487 O:26% D:30%	515 O:27% D:19%	83 O:4% D:6%	4 O:0% D:4%	64 O:3% D:4%	111 O:6% D:6%	29 O:2% D:3%
Eglinton DVP (1203)	30 O:2% D:3%	25 O:2% D:2%	211 O:18% D:25%	330 O:27% D:16%	-	328 O:27% D:20%	100 O:8% D:4%	103 O:9% D:8%	2 O:0% D:2%	22 O:2% D:1%	29 O:2% D:1%	23 O:2% D:3%
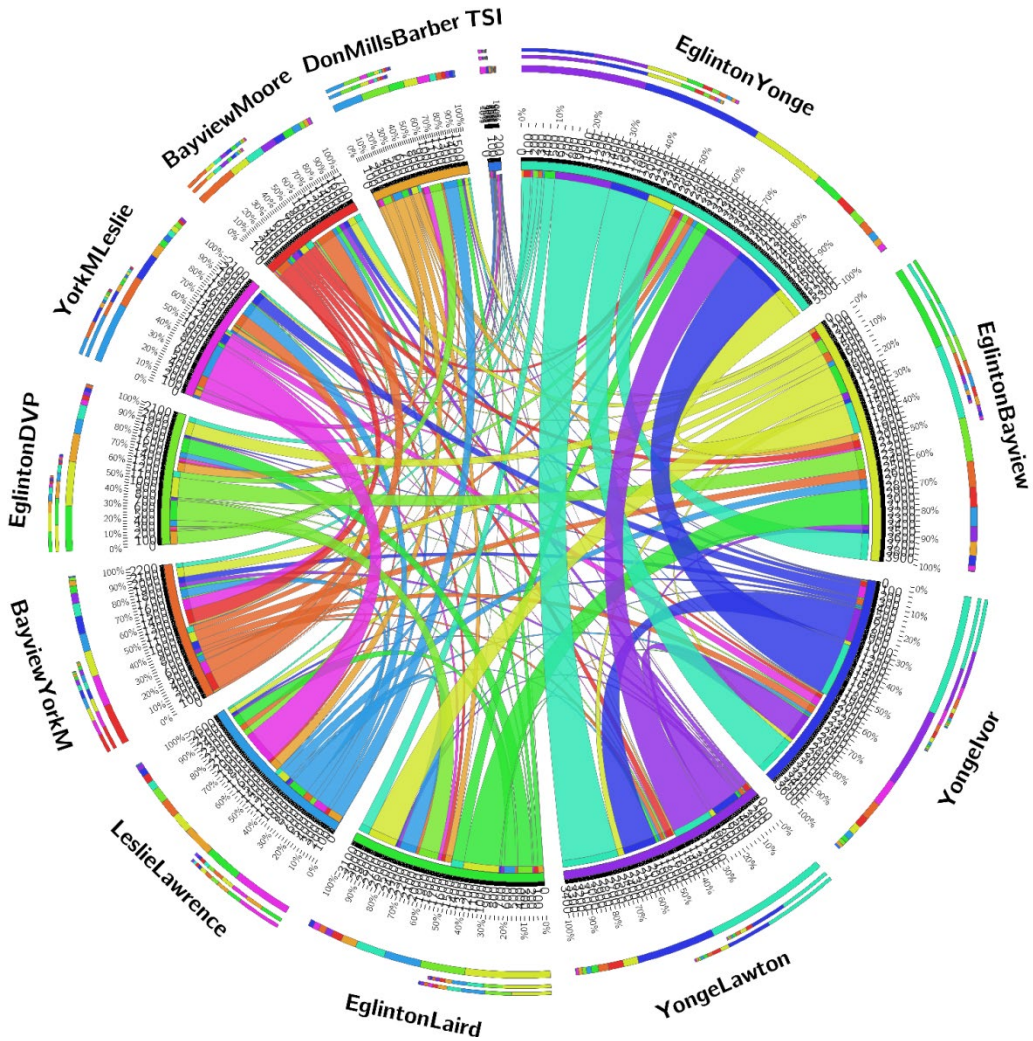
Custom Data Analysis

- Compare multiple data sets simultaneously

- Historical data easily overlaid for pattern and issue analysis for any given day or time period

- Easily expand or contract your time spans with the wheel of the mouse for macro or micro analysis

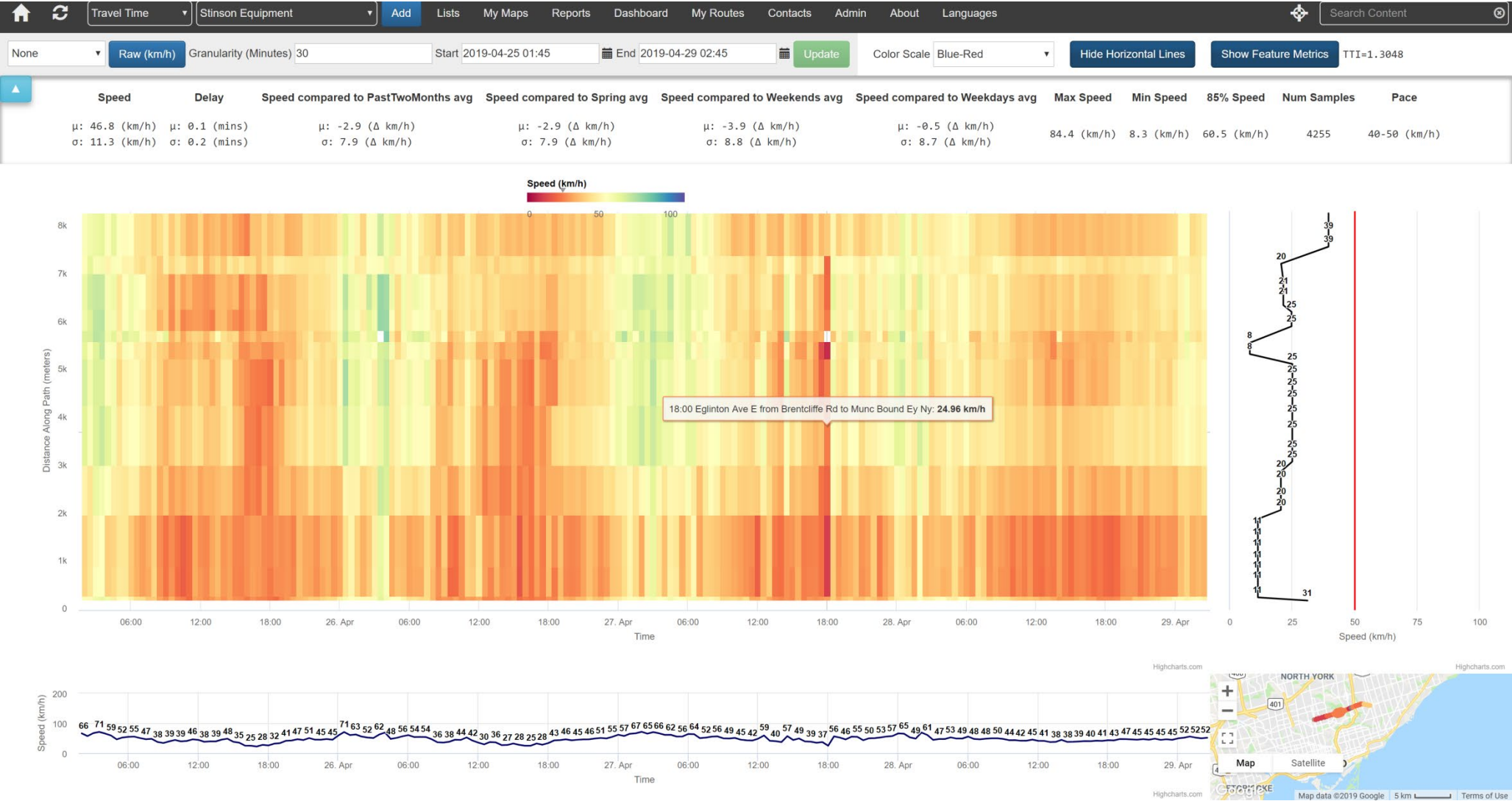- Export the datasets at anytime in an easy to use CSV file
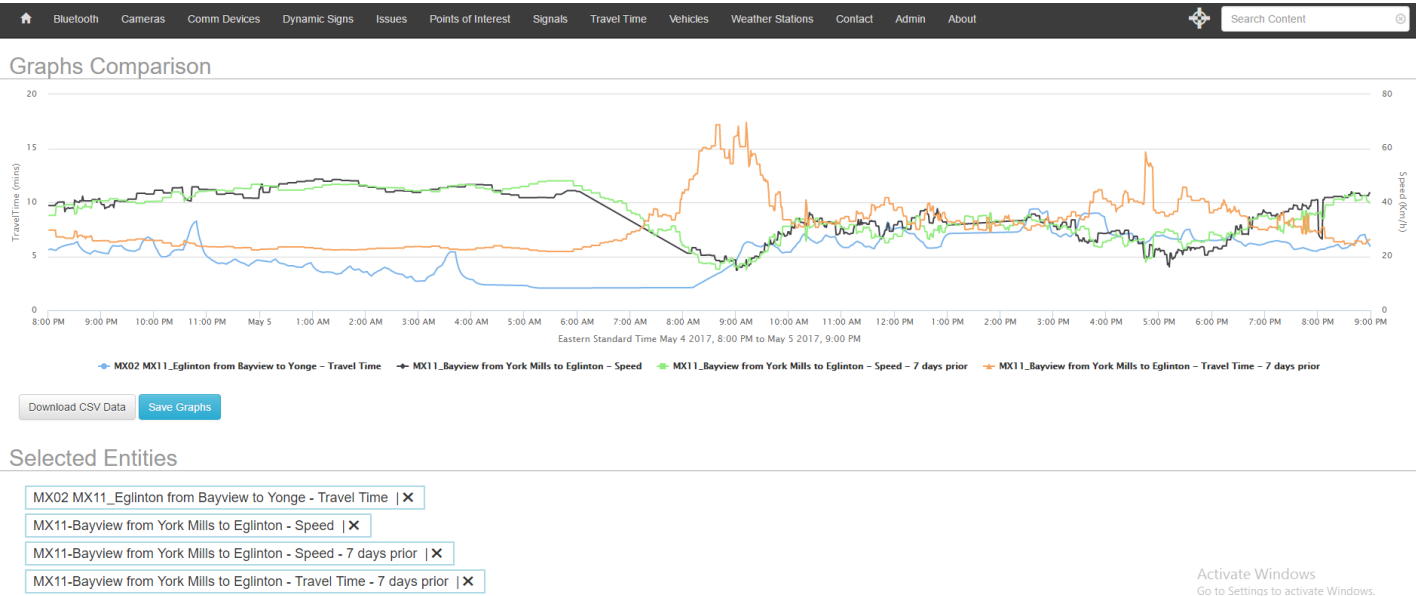
Maintenance or Fully Customizable Dashboard

- Fully customizable

- Aggregate multiple data sets for easy analysis

- Allows operators to monitor major conditions at a glance

- Ground truthing video and other sources allow for quick validation of reported issues
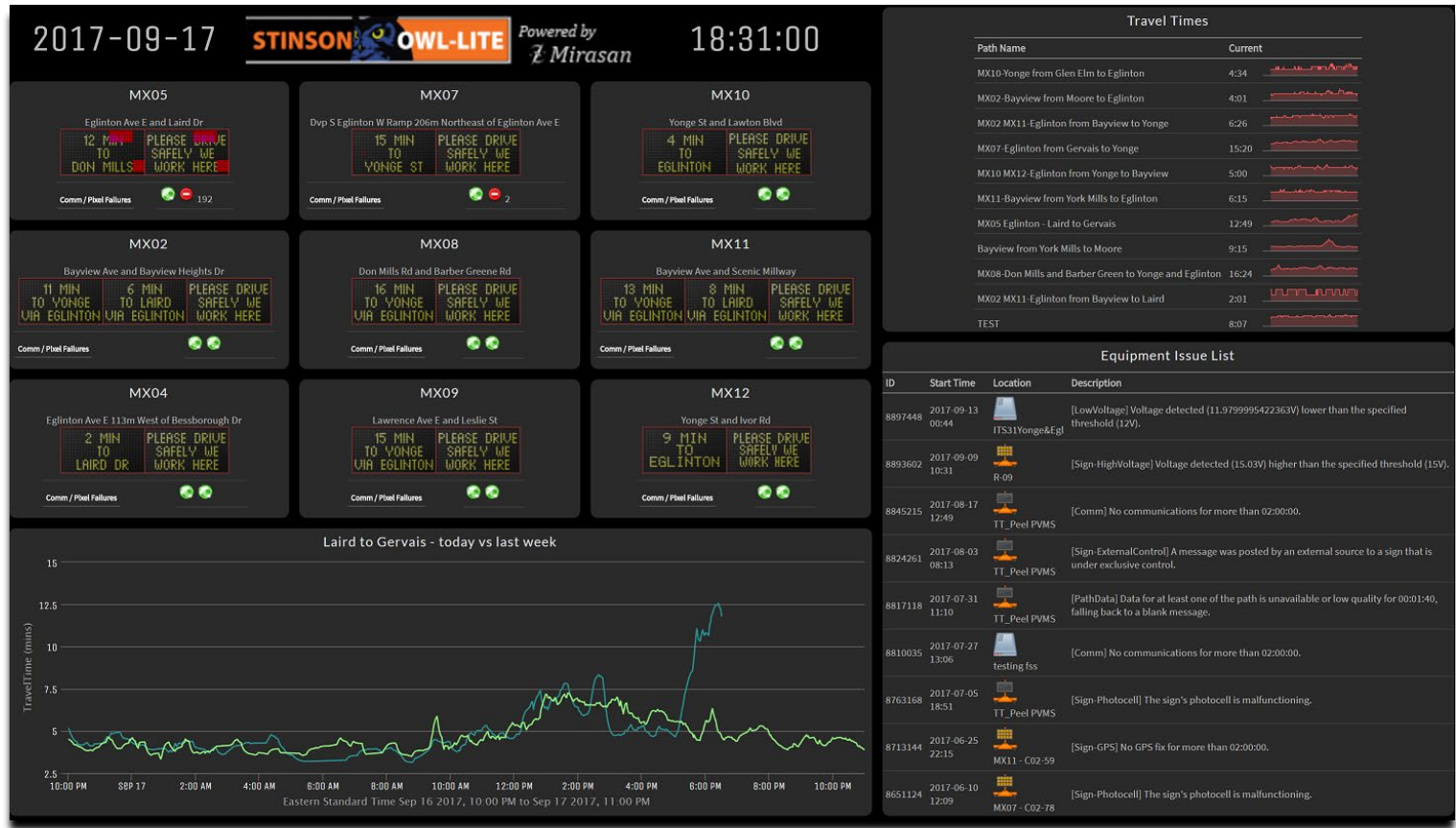
Advanced Heatmap Analysis + TTI

Maintenance Management

- An issue is anything that may require the users attention

- Loss of communications, low voltage, low volume/speeds, above average congestion etc all can trigger an issue alert

- Email alerts to any number of users possible for various sets of issue reporting

- Alerts can be sent M2M to any other software systems as well such as Emergency Services Dispatch and maintenance crew dispatching systems

- Maintenance crews and users can manually add an issue to a device for tracking purposes. Things like regular maintenance checks, firmware upgrades, battery/hardware changes. Great tool for tracking maintenance activities

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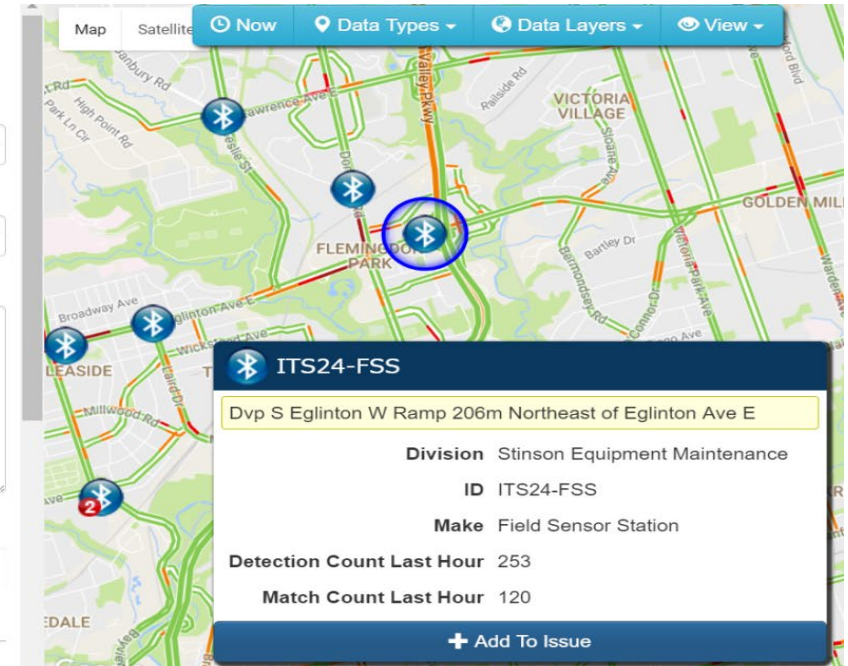
Latest Development (Artificial Intelligence)

- Collaboration with Ryerson University

- Mode Choice

- Explore the use of AI to determine if detected signal is from car, bus, bike or walking i.e mode choice

QUESTIONS?