

# Bluetooth Travel-Time Monitoring



1. What is Bluetooth and a MAC address
2. What is BlueTOAD
3. How does BlueTOAD use Bluetooth to generate Travel-Times & Speeds
4. BlueTOAD Configurations
5. BlueTOAD Website:
  - ☐ Data Outliers
  - ☐ Extracting MAC addresses
  - ☐ Real-time application
6. BlueTOAD in 3<sup>rd</sup> party applications

**Operations** – real-time accurate travel-times and speeds via a website and/or data push to your website. Arterials are a great application for BlueTOAD as it is a performance based tool.

**Work Zones & Evacuation Routes** – due to the flexible and simple installation being solar-powered and cellular uplink, it takes less than an hour to install a unit, BlueTOAD is being used for work zone projects

**Traveler Information & 511** – Having a complete turn-key solution, we are able to push out travel-times and speeds via XML real-time to your website.

**ITS** – with real-time information, you are better informed on what is going on with key arterials and/or freeways.

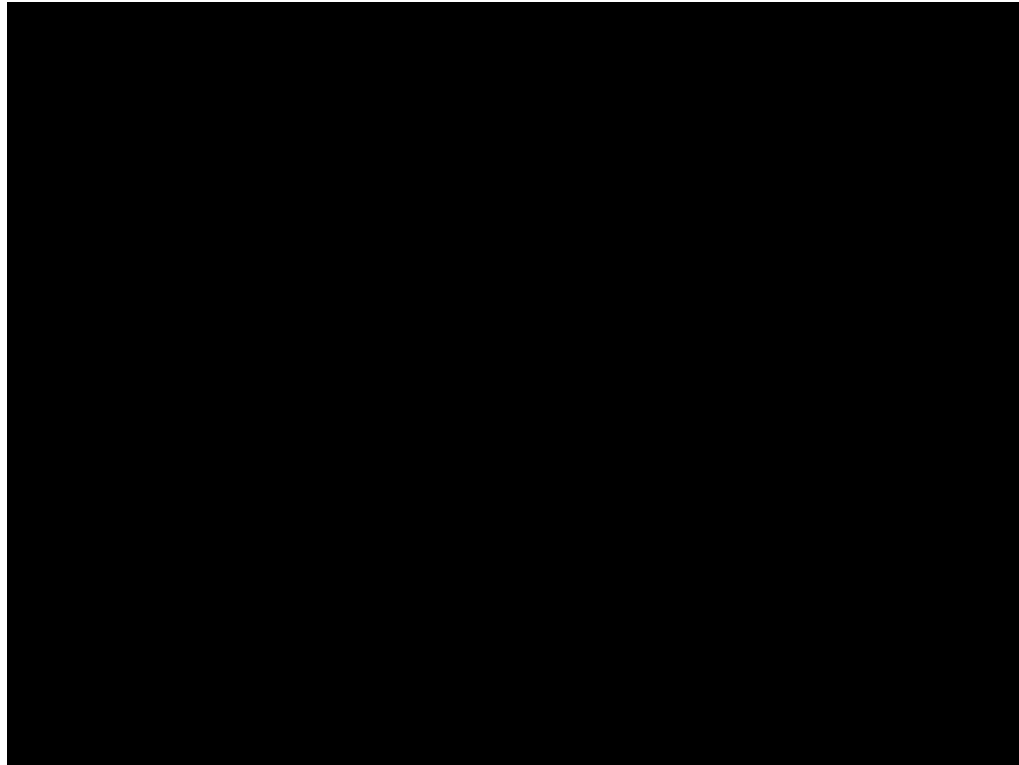
**Planning** – all data is being archived and can be used for later retrieval. This is also a great addition to travel-demand models as it can validate the model and add arterial data to it. Before and after studies of re-timed signals is now 24x7 and automated.



# BlueTOAD – Bluetooth Travel-Time Origination And Destination

- **Bluetooth** is an [open wireless](#) technology standard for exchanging data over short distances from fixed and mobile devices, creating [personal area networks](#) (PANs) with high levels of security.
- Bluetooth uses a radio technology called [frequency-hopping spread spectrum](#) and is in the 2.4 GHz short-range [radio frequency](#) band
- A **Media Access Control address (MAC address)** is a [unique identifier](#) assigned to [network interfaces](#) for communications on the physical network segment





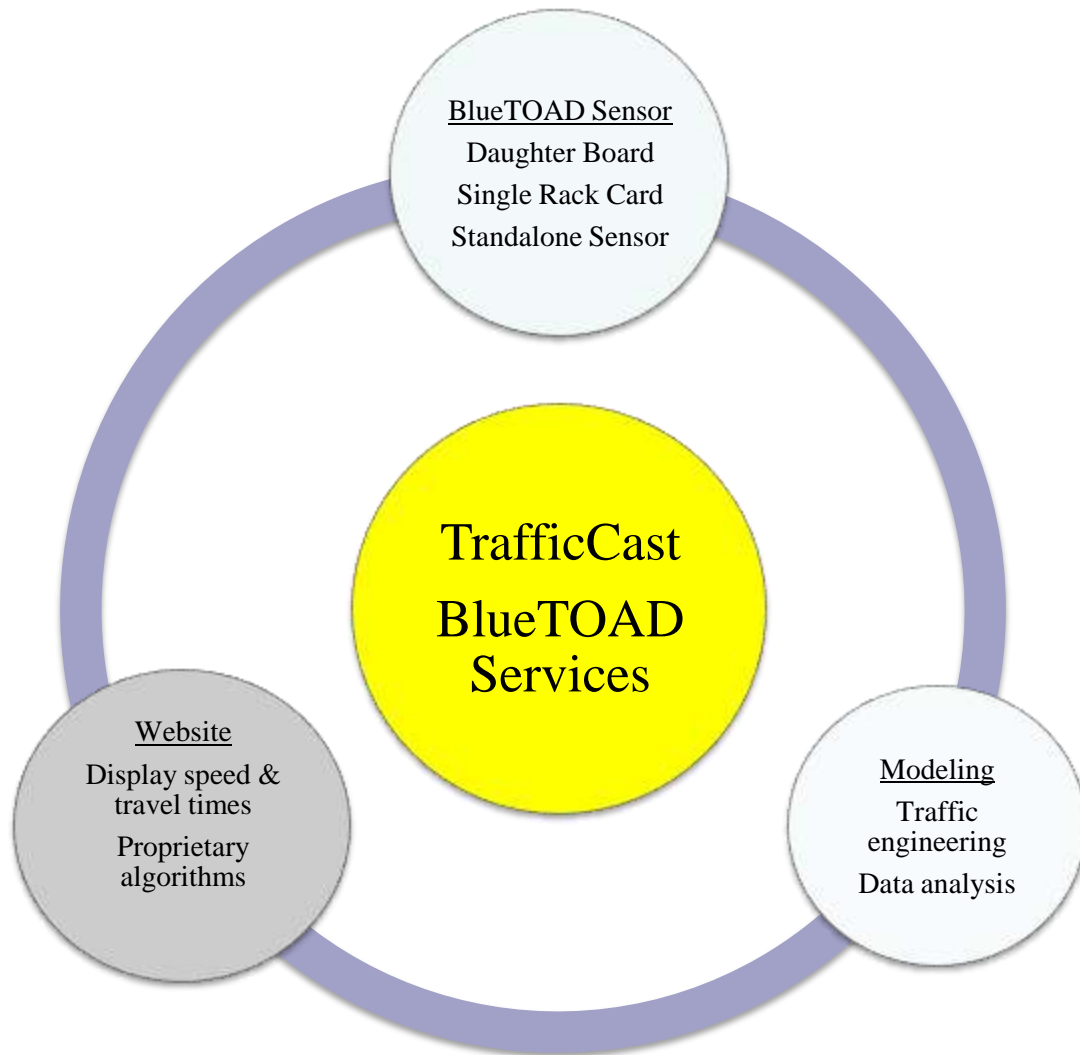


TrafficCast has leveraged the mobile phone industry's use of open hardware and software platforms to create BlueTOAD for travel-times and speeds.

✓ **Key Features:**

- Completely non-intrusive, MAC address pairing
- Limited or no configuration (~30 min. install)
- Stand alone or in existing cabinet
- Local and Wireless Operation (Ethernet)
- For use in Arterials and Freeways
- Real-time network and device monitoring
- Over-the-Air software downloading
- Web Services Interface (24x7 monitoring)
- Future expansion design





BlueTOAD is a highly integrated product offering by TrafficCast that includes:

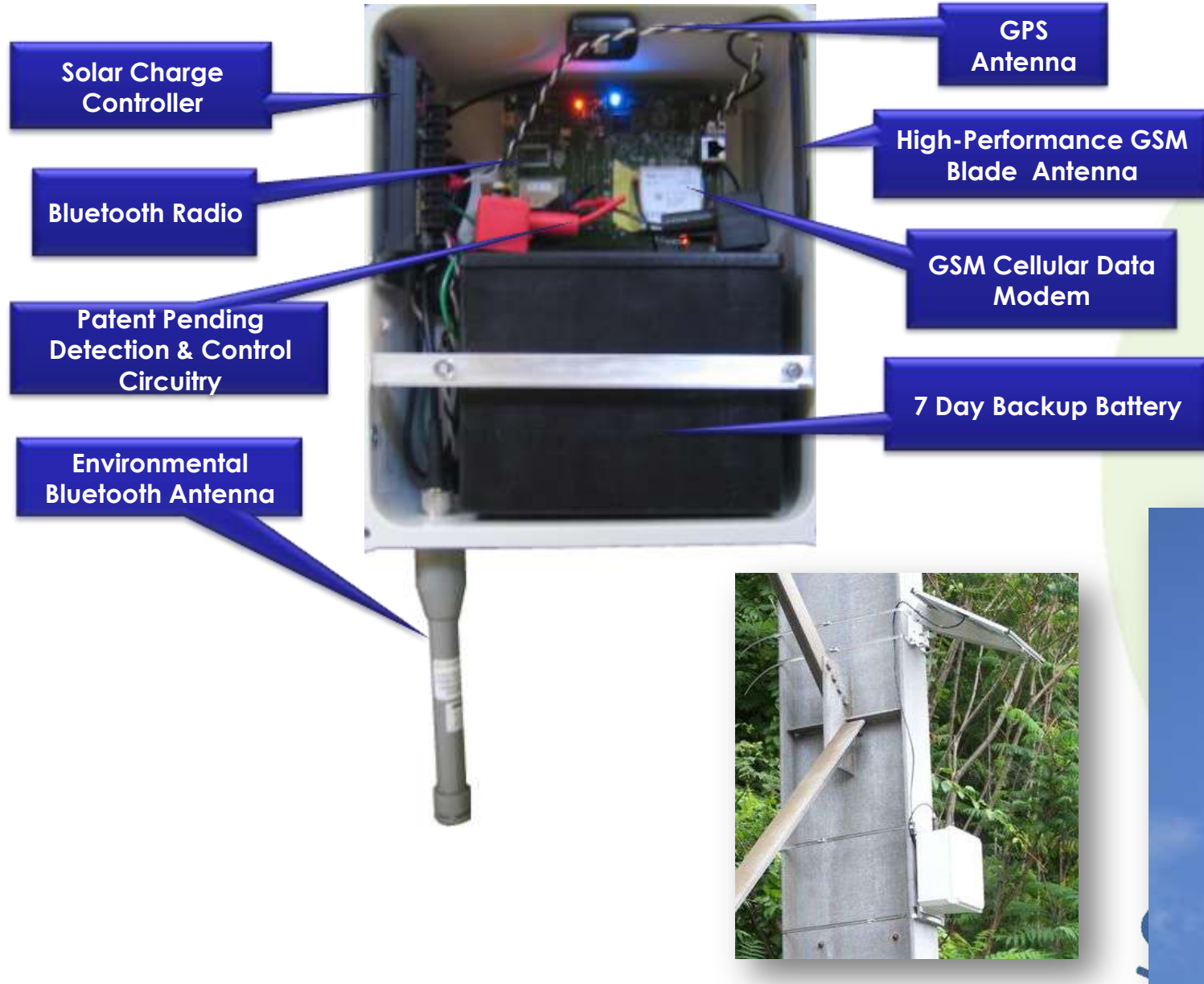
- ❑ Web portal that allows customers to view the speed and travel times generated by the sensors
- ❑ Proprietary algorithms that smooth the data based upon road classes (i.e. arterial, expressways, etc.)
- ❑ Traffic engineering and data analysis that check to see if the data is accurate



**Solar/Cellular BlueTOAD****Ethernet BlueTOAD****Mini-BlueTOAD**

### All Configurations:

- ✓ Permanent or Temporary
- ✓ Ethernet and/or Cellular
- ✓ AC or Solar Power
- ✓ Real-Time or Post Processed
- ✓ Web-enabled and Archived



Ethernet BlueTOAD:

- ✓ IP addressable – static or DHCP
- ✓ Outbound network traffic only
- ✓ Ethernet 10Base-T/100Base-T
- ✓ Single slot only needed





### Features:

- ✓ 14 day battery
- ✓ 6"x6"x4" form factor
- ✓ AC or Solar Power
- ✓ 2 GB SD Card Storage
- ✓ Simple upload
- ✓ Optional Solar Panel



## BlueTOAD – Website

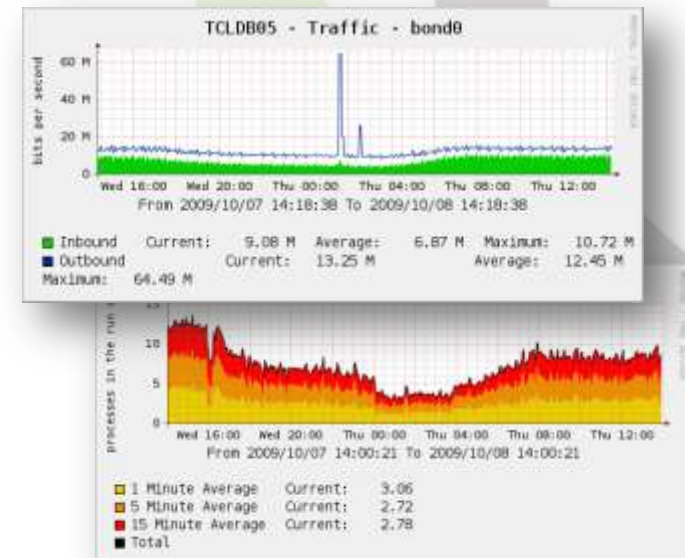
### Challenges:

- ✓ Data Outliers – Filter them out
- ✓ Provide Smoothing Algorithm to determine travel-times
- ✓ Real-Time Communications - Cellular



## QWEST® CYBERCENTER® FACILITIES—BlueTOAD's FOUNDATION FOR SUCCESS

- **QWEST NOC: “Built like a brick shipyard”**
  - Blast resistant
  - Biometric Entry
  - Carrier Grade (peering location)
  - 3N + 1 generators
  - Hosts the Chicago Board Options Exchange
- **Two TrafficCast server clusters**
  - Real-time failover from primary to secondary
  - Major PND SLA is 99.9% uptime
  - Reporting 100% uptime most months





Filelok + https://192.168.1...-devtest\_dash.php x 192.168.1.173 / localhost | phpMyAd... +

← → https://192.168.1.173/lnoc-devtest\_dash.php

Most Visited Getting Started Latest Headlines phpMyAdmin - https:// Dashboard Login - DEV

## BlueTOAD Dashboard v0.9 (reporting 24 hour block)

Current GMT: 2011-09-20 19:18:55

Enter Device ID:

[Add New Device](#) | [Dashboard](#) | [Master List](#)

Or View By Customer tel\_willbur\_alpha

### tel\_willbur\_alpha

Device ID	Firmware	Num Heartbeats	Num MACS	Cur Voltage	Ave Voltage	Ave Temp	Status	Resets (24hours)	GSM Bit Error Rate	Num Satellites	Boot RSSI	GSM Channel	GSM RSSI	Last Measured HB	Last Insert HB	Last Measured MAC	Last Insert MAC
109	10132	145	2138	14	13.39	22	5	3	4	9	-76	224	-77	2011-09-20 19:08:00	2011-09-20 14:08:15	2011-09-20 19:12:15	2011-09-20 14:13:35
115	10132	145	4460	13.9	13.28	23	274	0	0	8	-49	129	-51	2011-09-20 19:06:17	2011-09-20 14:06:32	2011-09-20 19:13:08	2011-09-20 14:13:39
166	10132	149	2305	14.3	13.36	0	119	4	0	7	-48	129	-51	2011-09-20 19:06:38	2011-09-20 14:06:53	2011-09-20 19:13:43	2011-09-20 14:14:30
196	10132	143	5999	14	13.1	22	127	1	0	9	-58	153	-61	2011-09-20 19:06:14	2011-09-20 14:06:29	2011-09-20 19:13:35	2011-09-20 14:14:11
197	10132	141	9232	14.1	13.38	25	82	5	0	8	-61	181	-63	2011-09-20 19:07:07	2011-09-20 14:07:22	2011-09-20 19:14:12	2011-09-20 14:14:30
198	10132	143	6027	15.5	15.5	22	56	2	0	9	-63	233	-61	2011-09-20 19:06:29	2011-09-20 14:06:44	2011-09-20 19:13:31	2011-09-20 14:14:13
200	10132	161	722	14	13.28	22	7	5	1	9	-78	225	-79	2011-09-20 19:14:03	2011-09-20 14:14:18	2011-09-20 19:12:24	2011-09-20 14:13:01
201	0	0	0	0	13.28	22	0	0	0	0	0	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00
203	10132	165	427	13.9	13.3	22	33	6	0	9	-68	229	-71	2011-09-20 19:10:44	2011-09-20 14:10:59	2011-09-20 19:10:08	2011-09-20 14:11:18
204	10132	155	1105	14.1	13.35	21	20	5	0	9	-82	251	-87	2011-09-20 19:07:36	2011-09-20 14:07:50	2011-09-20 19:12:52	2011-09-20 14:13:33
205	10132	144	6746	14.1	13.43	22	968	0	0	9	-54	718	-55	2011-09-20 19:06:02	2011-09-20 14:06:17	2011-09-20 19:13:46	2011-09-20 14:14:01
206	0	0	0	0	13.43	22	0	0	0	0	0	0	0	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00	0000-00-00 00:00:00
208	10132	147	1256	14	13.2	17	15	15	0	9	-61	227	-63	2011-09-20 19:14:04	2011-09-20 14:14:19	2011-09-20 19:13:19	2011-09-20 14:13:52
209	10132	160	988	14.1	13.45	0	32	1	0	9	-48	246	-51	2011-09-20 19:12:32	2011-09-20 14:12:47	2011-09-20 19:12:57	2011-09-20 14:13:48
211	10132	144	4893	14.1	13.45	22	63	1	0	9	-48	239	-51	2011-09-20 19:12:41	2011-09-20 14:12:56	2011-09-20 19:13:35	2011-09-20 14:13:52

### TCS\_Tampa\_Demo

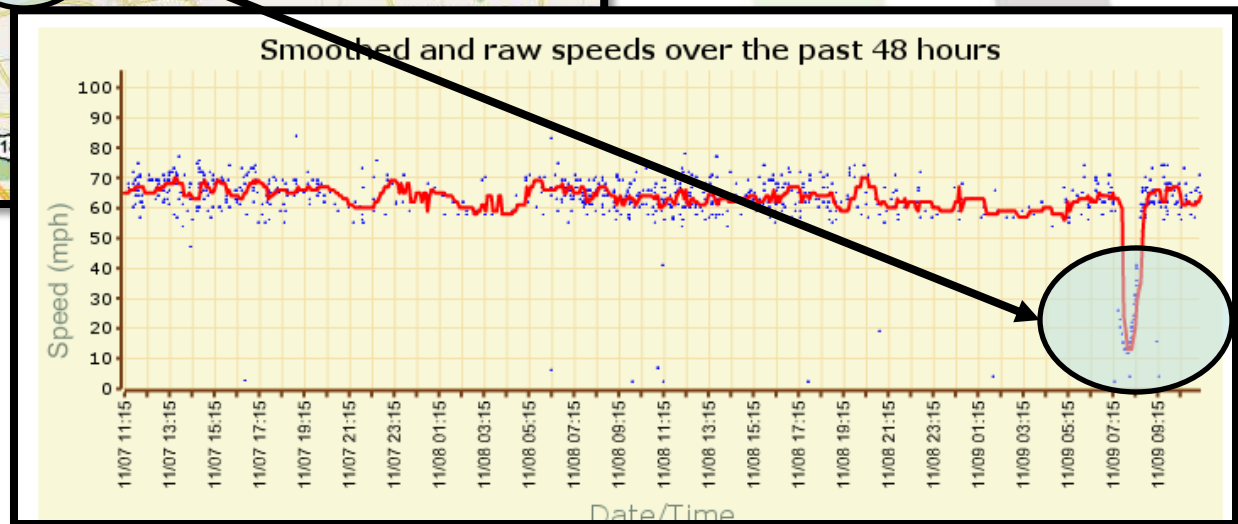
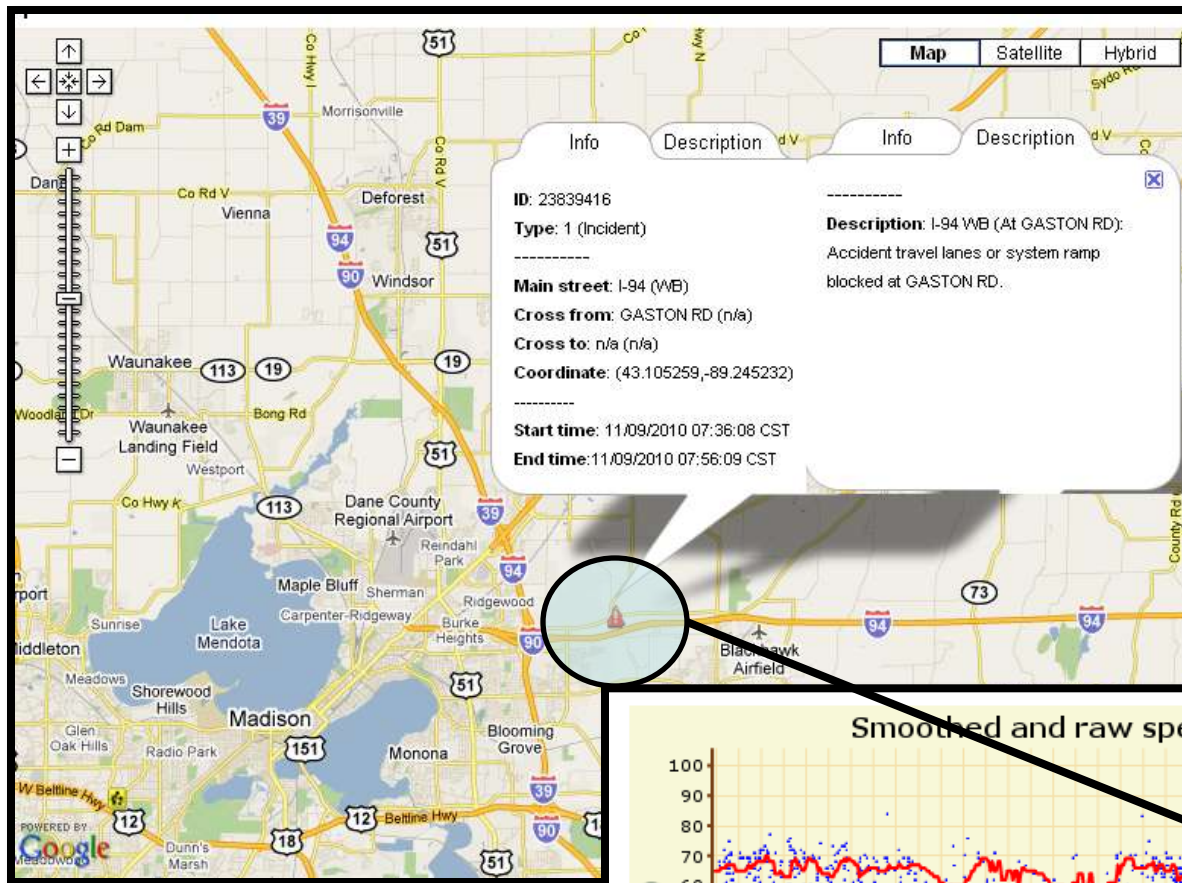
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161	10132	150	3068	13.8	13.34	33	5	2	0	10	-48	179	-51	2011-09-20 19:08:16	2011-09-20 14:08:31	2011-09-20 19:13:31	2011-09-20 14:13:47

# BlueTOAD Data for 3<sup>rd</sup> Party Applications

## XML for 3<sup>rd</sup> Party Applications.....







**Questions ??**

**Thank You!!**