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 3rd 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
How does BlueTOAD work with Bluetooth..
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™ Turnkey Solution

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

BlueTOAD Sensor
Daughter Board
Single Rack Card
Standalone Sensor

TrafficCast
BlueTOAD Services

Website
Display speed & travel times
Proprietary algorithms

Modeling
Traffic engineering
Data analysis
BlueTOAD Configuration Options…

All Configurations:

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

- Solar Charge Controller
- Bluetooth Radio
- Patent Pending Detection & Control Circuitry
- Environmental Bluetooth Antenna
- GPS Antenna
- High-Performance GSM Blade Antenna
- GSM Cellular Data Modem
- 7 Day Backup Battery
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
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
24/7 Remote Monitoring
BlueTOAD Data for 3\textsuperscript{rd} Party Applications
BlueTOAD Data In 3rd Party Applications

- XML for 3rd Party Applications
BlueTOAD showing an incident

ID: 23035416
Type: 1 (Incident)

Description:
I-94 W/B (at GASTON RD)
Accident travel lanes or system ramp blocked at GASTON RD.

Start time: 11/09/2010 07:36:08 CST
End time: 11/09/2010 07:36:08 CST

Smoothed and raw speeds over the past 48 hours
Questions ??

Thank You!!