Wireless Magnetometer
Vehicle Detectors

- Wireless Detector History
- Testing and Development
- How They Work
- Installation
- Results
- Alternatives
- Lessons Learned
- Maintenance
BDOT Wireless Detector History

- May 2006, Development of wireless Stop Bar Detection (Sensys)
- August 2006 Installed First Beta Prototype at Signal Facility Test Bed.
- May 2007 First Active Intersection Installation
  - Observation and timing adjustments
- September 2007 Begin Full Deployment Along Edmondson Ave.
  - Nine semi-actuated intersections
- November 2007 Purchase equipment for 50+ Intersections
- October 2010 thru November 2012, 182 installations by contract
- Total 241 Intersections 1422 sensors to date
- March 2013 Trafficware introduces wireless detector system (900 Mhz)
Testing Began - Simple Volume and Occupancy Counts.
- Comparison with baseline loop detectors, data recorded and analyzed through system controllers
- Sensors comparable with loops under all local weather conditions.
- About 1% error.

Stop Bar Capabilities Tested
- Full presence mode tested and verified.
- Optimum sensor placement and configuration established.
- Sensor sensitivity improvements implemented to detect a wider variety of vehicles.

Parked Vehicle Detection and Tune Out Tests (BDOT Requirement)
- Tune out function tested and verified.
- Firmware upgrade implemented for improved operation.

Wireless Detector System comparable to inductive loops in performance, functionality and stability.

2013 Install sensors for data collection at existing locations - under observation
Wireless Detector System
How it Works

Access Point / Receiver
RF Data Link
Detector Data Link to Controller
Wireless Sensors
The system is pre-configured in the shop to reduce field install time.

- Configuration tables produced.
- Installation drawings made to insure correct sensor placement
- The AP is set up and tested prior to being installed in the field.

Average set up time, out of the box to field ready is about one hour per intersection.
Field Installation

- Each flush-mount sensor is installed using a core drill
  - 4” diameter hole
  - 2 ½” deep
- Access Point / Receiver fastened to signal pole 25 – 30 feet high
  - CAT-5 cable is installed from AP to Controller
  - Detector cards are installed in the control cabinet.
- Average install time 1 hour
- Final set up 20 minutes

Average field install time, per intersection – About three hours*

* Typical install is 1 AP with four to six sensors. Assumes no other maintenance required. Does not include travel time.
Detector Improvement Results

- Reduced Peak Travel Times Along Arteries
- Eliminate Unnecessary Main Street Stops
- Faster Return to main Street Green
  - Minimizes unnecessary side street green time
- Reliable Side Street Detection
Alternatives + -

Wireless Technology

+ Good for actuated installations
+ Quick deployment, simple installation, relatively low cost
+ Accurate
+ Small footprint in roadway
+ Sensors may be retrieved from road

- Lap Top required for field diagnostics (as most systems are these days)
- Sensors can be destroyed by pavement milling.
- Works best with line of sight AP to Sensor. Large obstructions can be a problem.
Alternatives + -

- Good Ol’ Loops
  + Lowest equipment cost
  + Accurate
  + No special equipment for diagnostics

- Labor intensive and costly installation
- Large footprint, easily damaged

inductive loops
Video Detection

- Wide coverage, multi-lane detection
- Non-intrusive
- Easy to add / change detection zones

- High cost for small intersections
- Extensive cabling required
- Special equipment for diagnostics
- Periodic cleaning of the camera lens
  cleaning frequency can vary from six months to one year

Thermal Imaging Cameras ??
A Wireless Solution

No practical placement for video
Loop installation too costly.
Lessons Learned
Wireless Detector Installation

- Site survey is essential for any detector type.
  {Be prepared to make adjustments in the field.}
- Configure, shop test and “kit” the detector system for installation.
- Ensure contractor is familiar with installation and configuration of the system.
- Documentation, Documentation, Documentation
  {Take time for as built drawings, and detector system configuration sheets.}
- Use high quality CAT-5 cable and connectors. (polyethylene jacketed)
- Sensors can be installed in base asphalt then overlaid.
  (not recommended by the manufacturer)
- Sensors can be removed before milling, the reinstalled.

Equipment Failures Since 2007

- 8 APs replaced
- 21 Sensors destroyed by milling
- 4 Contact Closure cards
- Recall of 50 defective sensors 2011
Maintenance

- Don’t Forget Pedestrian Detectors (Push Buttons)
  - Push buttons checked for proper operation during detector install
  - Defective buttons replaced
  - Defective wiring corrected or replaced

- There is no such thing as set it and forget it…For any System
  - Expect increased maintenance as equipment ages
    - Control Equipment
    - Detectors
    - Poles and Cabling
    - Signals