

Russell Allen
Florida Department of Transportation

Waze – FDOT Integration

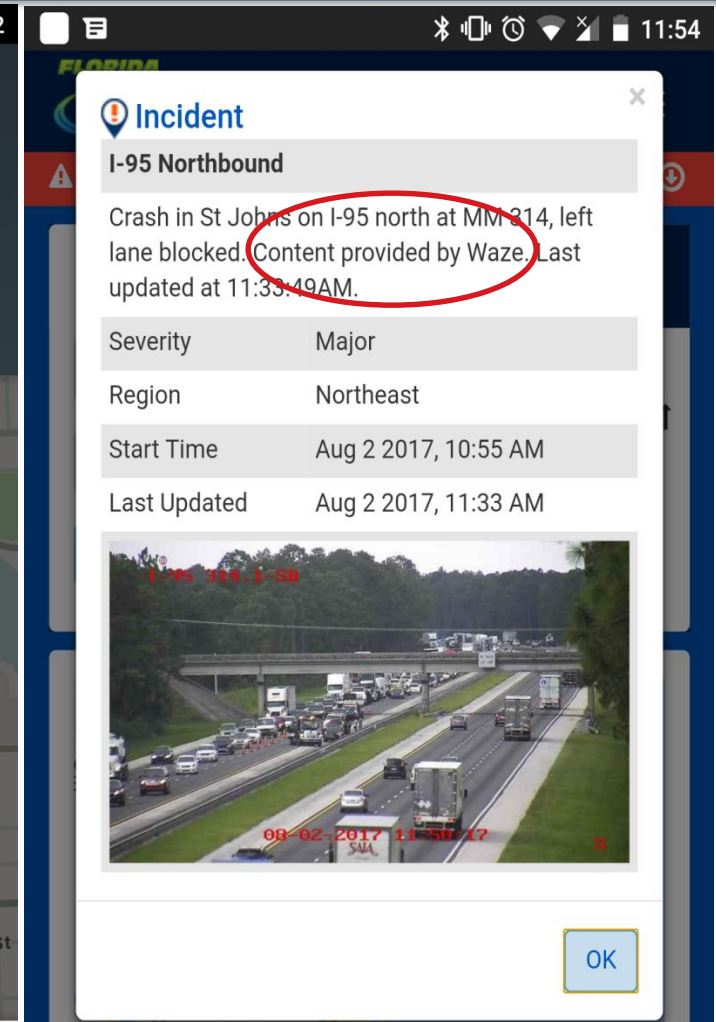
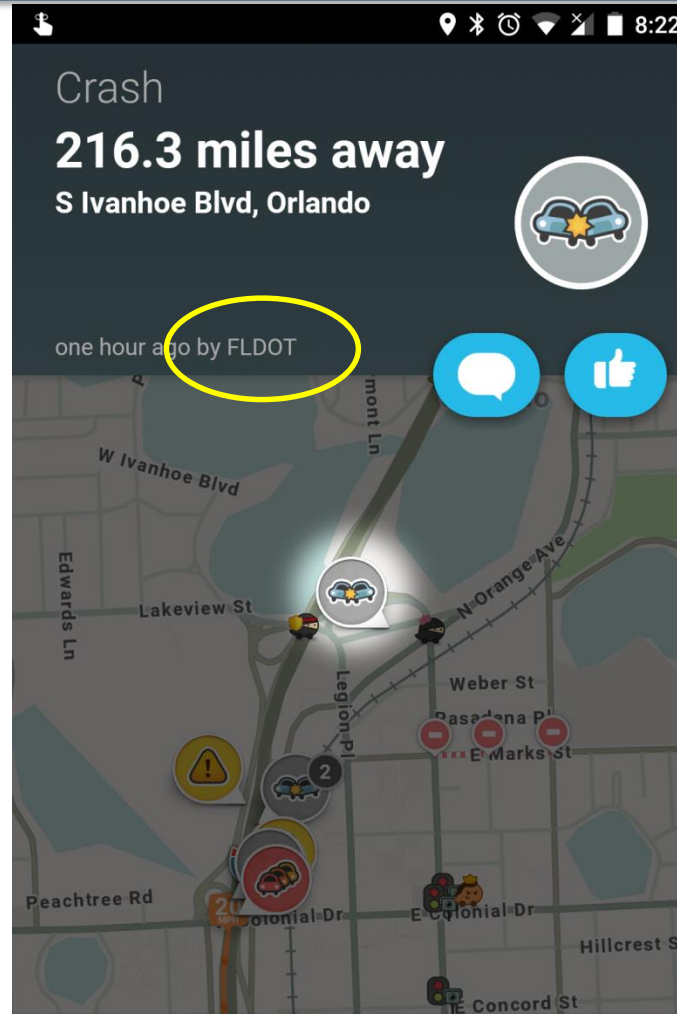


FDOT - Waze Integration

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- Obtain incident data on Florida's state arterial roadways
 - Deployments on most limited-access highways
- Provide data to a third party to reach more motorists

- Data sharing agreement effective 3/28/2014
- Requires attribution by both parties





Data Sharing – FDOT to Waze

LCIS

- Lane Closure Information System



FDOT Regional Transportation Management Centers (TMC)

- TMC receives planned closures
- TMC Operators produce incident data
- Intelligent transportation systems (ITS) detectors produce traffic conditions data



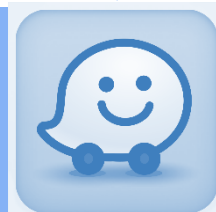
FL511 System's Third Party Data Feed

- Collects data from TMCs statewide
- Packages data as single data feed



Waze

- Receives FDOT Data
- Provides Crowd-Sourced Data





Providing Road Closure Data

- Waze was looking for planned road closures
 - They had a manual process for submitting these
- FDOT created a planned road closure feed, that incorporated regular updates from the Districts into a JSON feed that automatically updates subscribers



- Statewide database of scheduled road closures
- Expands on an earlier effort by FDOT District 6 (Miami area)
- Also provides a web service interface that can be queried by partners, such as Waze



Lane Closure Information System (LCIS)

- Searchable public web site, displays results on map



Florida Department of
TRANSPORTATION

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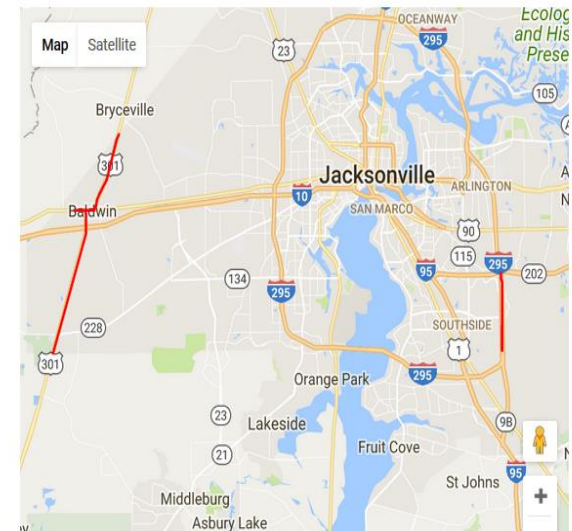
Lane Closure Information System

Search Log In Help

Search for Closures

Search form fields:

- district: District 2
- county: Duval
- containing text: search text (3 characters min)
- location: enter a location
- search radius: 50
- active dates: 1/1/2016 to 8/1/2017
- Buttons: search, reset search





Attribution – Phase 2



Connect. Know. Go.

CALL 511



TWITTER



FREE APPS



TEXT ALERTS



Statewide ▾

English ▾

Register

Login

Home

Traffic ▾

My Florida 511 ▾

Construction Info

Emergency Info

Transit / Airports

Links

Newsroom

ALERTS Wet roads and rainy conditions may cause intermittent slow traffic in Broward County. Please use caution.

TRAFFIC EVENTS

Filter

Region

Northeast ▾

Direction

None selected ▾

✕ Clear Filters

County

None selected ▾

Type

None selected ▾

Roadway

None selected ▾

Severity

None selected ▾

Show 25 ▾ entries

Search:

Region	County	Roadway	Direction	Type	Severity	Description	Start Time	Last Updated	Camera Image
Northeast	Duval	I-10	E	Incidents	Major	Crash involving truck in Duval on I-10 east before Exit 258 I-295 W, 2 right lanes blocked. Content provided by Waze. Last updated at 08:02:16AM.	8/28/17, 6:45 AM	8/28/17, 8:02 AM	

Attribution – Phase 2



FL511 Statewide
@fl511_state

FREE TRAFFIC INFO
FLORIDA 511
STATEWIDE

Tweets 706K Following 173 Followers 2,214 Likes 55 Lists 1

Tweets Tweets & replies Media

View 4 new Tweets

FL511 Statewide @fl511_state · 17m
Updated: Crash in Duval on SR-10 / Atlantic Blvd west at Lee Rd, 2 left lanes blocked. Content provided by Waze...[fl511.com/EventDetails/D...](#)

FL511 Statewide @fl511_state · 19m
Cleared: Planned construction in Duval on Main Street Bridge south at St Johns River, right lane blocked. Last updated at 11:53:02AM.

FL511 Statewide @fl511_state · 19m
New: Crash involving a tractor-trailer in Broward on I-75 north before Exit 19 I-595, 4 right lanes blocked. Last...[fl511.com/EventDetails/D...](#)



Tweets 706K Following 173 Followers 2,214 Likes 55 Lists 1

FL511 Statewide @fl511_state · 26m
Cleared: Planned construction in Duval on Main Street Bridge north at St Johns River, left lane blocked. Last updated at 11:52:49AM.

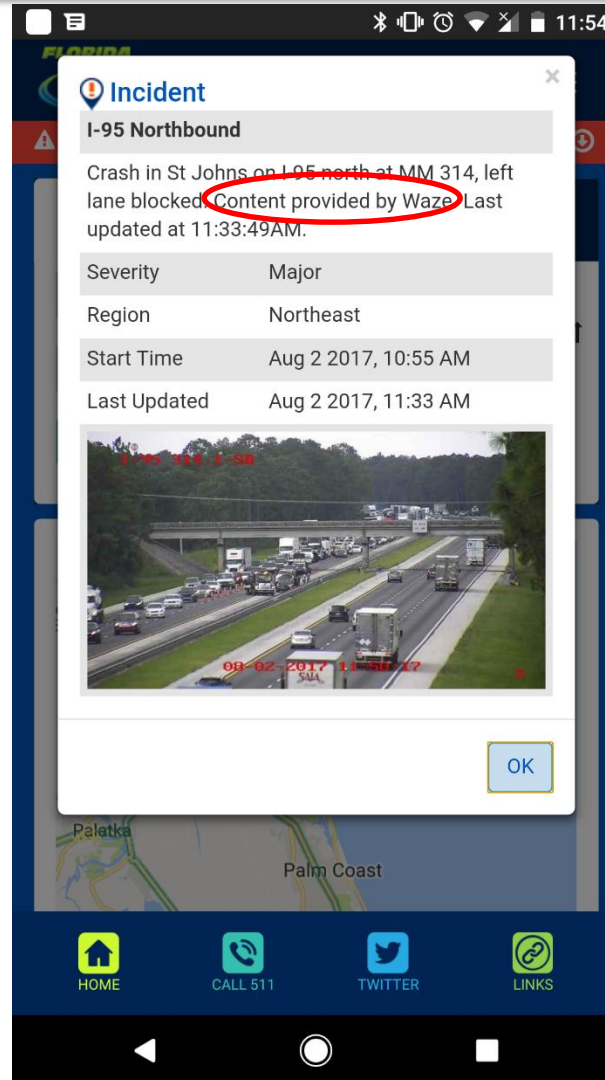
FL511 Statewide @fl511_state · 28m
Updated: Crash in Duval on SR-10 / Atlantic Blvd west at Lee Rd, all lanes blocked. Content provided by Waze...[fl511.com/EventDetails/D...](#)

FL511 Statewide @fl511_state · 29m
New: Crash in Duval on SR-10 / Atlantic Blvd west at Lee Rd. Content provided by Waze. Last updated at...[fl511.com/EventDetails/D...](#)

FL511 Statewide @fl511_state · 30m
Updated: Planned construction in Volusia on I-95 south at MM 262, left lane blocked. Last updated at 03:43:58PM. [fl511.com/EventDetails/D...](#)

FL511 Statewide @fl511_state · 30m
Updated: Planned construction in Brevard on I-95 north at MM 165, left lane blocked. Last updated at 03:43:55PM. [fl511.com/EventDetails/D...](#)

Attribution Phase 2 – 511 App





FDOT Third-Party Data Feed

- Provides statewide real-time data
 - Sent by TMCs to FL511
- Feed updated every one minute
- Data types Include:
 - Floodgates
 - Traffic events
 - Camera images
 - Dynamic message sign messages
 - Traffic speed
 - Travel times

The Waze Feed

- JSON – Javascript Object Notation
- Updated every 2 minutes
- Three primary types of data
 - Alerts: Crashes, Abandoned Vehicles, etc.
 - Jams: Stalled or slow moving traffic
 - Irregularities: Similar to Jams, but with wider impact
- We're only using Alerts today

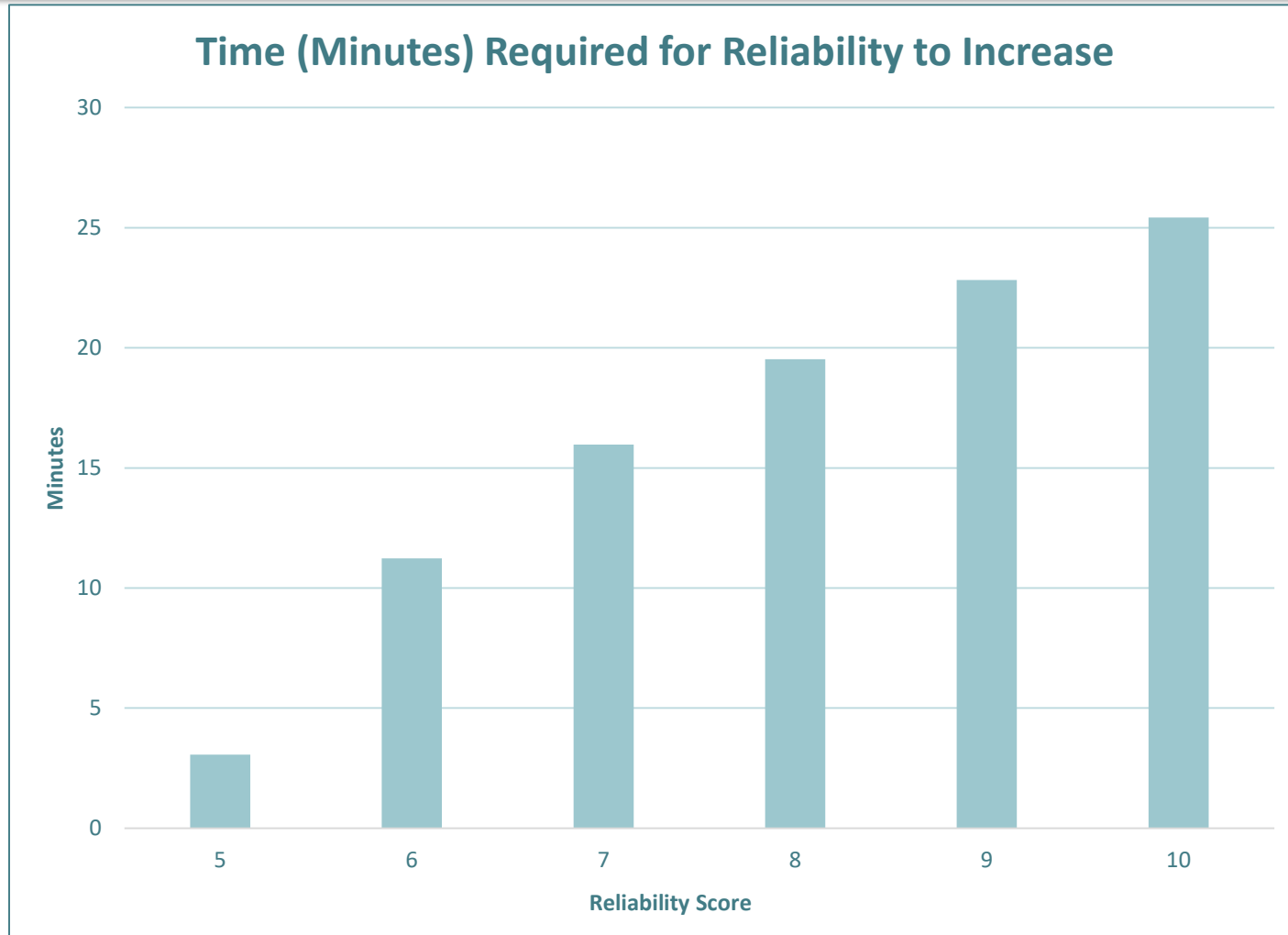
- Request geo-fenced data
 - We request data for the entire state
- Exclude alerts that originated in SunGuide®



Alert Quality Measures

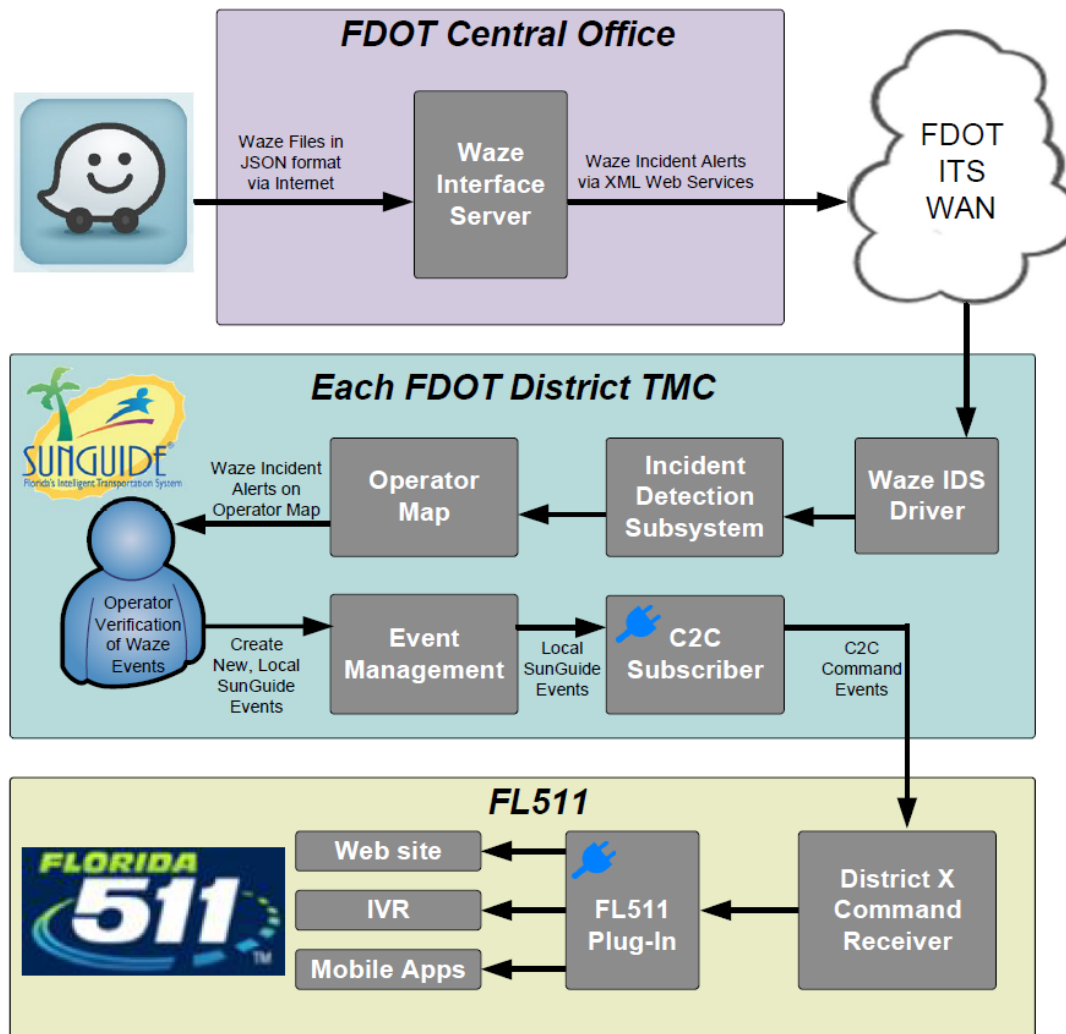
- Report Rating: how “experienced” is the Wazer who originally reported the alert?
- “Thumbs Up”: how many Wazers have used the Waze app to give the alert a “thumbs up”
- Reliability: similar to “Thumbs Up”, but also takes into account Wazers who give the alert a negative rating
- Confidence: similar to Reliability in that it’s based on feedback from Wazers

Reliability Score Delay



The FDOT Waze Reader

Phase 2 Integration – Incident Detection System Diagram



- Recommendations
 - Check feed for consistency and have e-mail notifications
 - Changes in the feed should not adversely affect program's operation

- What do we need to provide?
 - Sending data to operations
 - Some data filtered out, starting with
 - Weather conditions
 - Other / chit-chat
 - Miscellaneous

- Other filtering decisions
 - Decentralized with seven Districts and a Turnpike Enterprise.
 - Districts do not need statewide data
 - Districts monitor the state roadway system
 - How many alerts can staffing handle



- Filtered out Debris on roadway
 - Could not verify debris on cameras because it was too small
 - Sent Road Rangers, but debris already moved itself off the road
- Filtered out all vehicles on shoulder
 - Typically not motorist in need (sent Road Rangers)
 - Could be construction crews, surveyors, etc.
 - Too many to handle when we don't know if someone needs assistance
- Should filter out vehicle on roadway
 - Typically the vehicle is actually on the shoulder.



Decisions – Data Filtering

- Filter out missing signs – not needed in the TMC
- Filter out weather – get this through other means
- Filter out potholes – we don't have potholes
- Filter out construction (unless it is road closure)
 - Too many times it was not an active construction zone, i.e. barrels on the shoulder, not construction staff

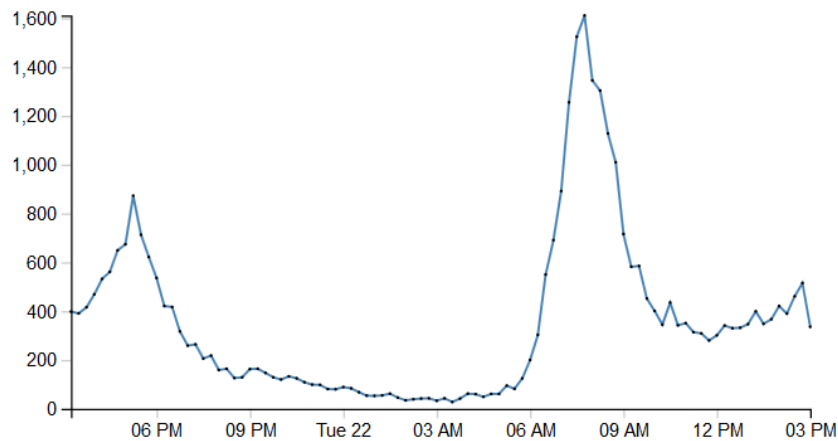


Decisions – Data Filtering

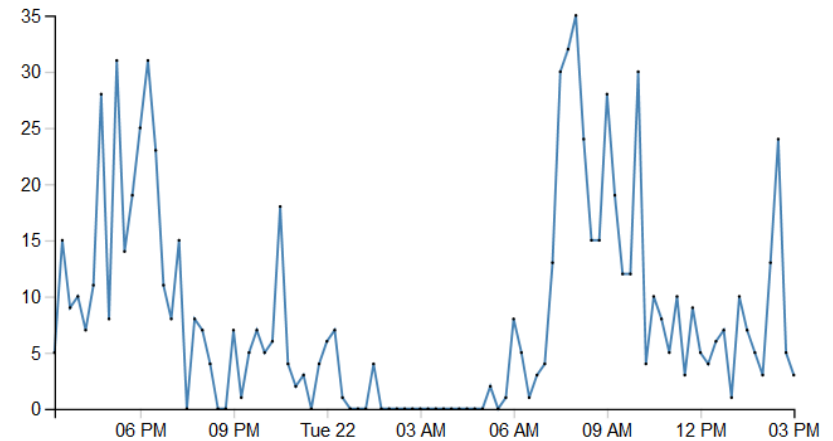
- The few things we allow through
 - Crashes – not filtered based on reliability score
 - Road Closures (complete closure)

- Over 90% of all alerts are filtered out

Inbound Waze Alerts



Outbound Waze Alerts



Integration with SunGuide®





SunGuide® Software

- FDOT's statewide advanced traffic management systems (ATMS) software
 - Integrates ITS devices and TMC operations
- Waze data integrated into SunGuide software
- Two phases:
 - Quick integration (Phase 1)
 - Long-term integration (Phase 2)



Communications Infrastructure

- Statewide private fiber and microwave network – ITS wide area network (ITS WAN)
- SunGuide software uses this network to communicate between TMCs
 - Phase 1 – SunGuide's Center-to-Center module
 - Phase 2 – Direct XML feed

- **Goal** – make processing Waze events more efficient for operators
- Use SunGuide software Incident Detection Subsystem (IDS) instead of Center-to-Center
- IDS will retrieve data using a web services interface


- Operator no longer needs to monitor map for new Waze events
- Waze events generate an alert box
 - Operator can select alert for further action
- Some Waze alert information automatically populated
 - Event location
 - Notifying agency and contact

- Alerts reported by SunGuide's Incident Detection Subsystem (IDS)

Detected	Type	Details
3 min ago	Waze	Incident detected by Waze: Leo Alert - T E S T
3 min ago	Waze	Incident detected by Waze: Crash - Jefferson
3 min ago	Waze	Incident detected by Waze: Crash - Gadsden
3 min ago	Waze	Incident detected by Waze: Crash - Jefferson
3 min ago	Waze	Incident detected by Waze: Congestion - Jefferson
3 min ago	Waze	Incident detected by Waze: Amber Alert - Hamilton

Alarm Details
 Create New Event (0 miles from reported location)
 Dismiss as False Alarm
 Associate to Existing Event
 Find on Map

Alert Handling

 Handle Alarm: waze-636383094824152443

Alarm Type: **Waze**
 Device: **Waze Event ID waze-12345**
 Reported Location: **I-10 Westbound {Lat: 30487200, Lon: -84292850}**
 Nearest EM Location: **Leon on I-10 Westbound, At MM 200**
 Detection Time: **8/14/2017 12:11 PM**

Find On Map

 Source: **Waze Feed**
 County: **TEST**
 Contact: **Waze**
 Event Type: **Leo Alert**
 Description: **description string**
 Started: **8/14/2017 12:11 PM**
 Updated:
 Waze Record Removed:
 Nearby Events:

What would you like to do?
☐ Create New Event (0 miles from reported location)
☐ Dismiss as False Alarm
☐ Associate to Existing Event

Next >

Cancel

Event Management

Event Details - 12048

Save Event

Release Ownership

Clone Event

Open Response Plan

Save and Suggest Response Plan

Terminate Response Plan

Find on Map

Nearest CCTV

Generate Chronology Report

VisioPad Detection:

☐ No CCTV?
☐ Disable while event is active

Involved Vehicles:

There are currently no vehicles involved.

Primary Event:

None

Show Event Details

Secondary Events:

None

Injuries:

N/A

Weather Conditions:

Road Surface: Dry Weather: Cloudy Lighting: Daylight

SAE Description:

Unconfirmed Incident in Leon county, going Westbound on I-10 at MM 200 Last updated 8/14/2017 12:20:07 PM

Comments

Operator

Add Comment

Event History

Date	Category	Details
08/14/2017 12:20:07	COMMENT	(General) Waze Incident reported: EventType: Leo Alert Waze ID: waze-12345 County: TEST Source: Waze Feed Waze Event Type: Leo Alert Location: Westbound I-10 [30487200, -84292850] Desc: description string Published time: 8/14/2017 12:11:22 PM

Responders: There are currently r

Agency	Notifier By TMC
Group: Core Responders	
EM_Generic_Agency	<input type="checkbox"/>
TERL TMC	<input type="checkbox"/>
FHP	<input type="checkbox"/>
Brian's Long Test Agency	<input type="checkbox"/>
Tow	<input type="checkbox"/>
Road Watcher	<input type="checkbox"/>
Vernell Johnson	<input type="checkbox"/>
Group: Other Responders	
VisioPaD Detection	<input type="checkbox"/>
TSS Detection	<input type="checkbox"/>
Emergency Medical (EMS)	<input type="checkbox"/>
Medical Examiner	<input type="checkbox"/>
FDOT Maintenance	<input type="checkbox"/>
HAZMAT	<input type="checkbox"/>

ified

On Scene

Departed

0

0

0

No status messages reported.

9/14/2017

I-95 CC Crowdsourcing Summit - FDOT Data Integration

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Event Management

Event Details		Save
FHP Incident #:	<input type="text"/>	Waze Incident #: <input type="text" value="425416807"/>
Event Type:	<input type="text" value="Disabled Vehicle"/>	<input type="checkbox"/> HAZMAT <input type="checkbox"/> Fire <input type="checkbox"/> Rollover <input type="button" value="Clone event"/>
Nearest CCTV:	<input type="text" value="007_BoschMIC7000"/> <input type="button" value="Preset: 0"/> <input type="text" value="Timestamp: 3/23/2015 14:09"/> <input type="checkbox"/> No CCTV	<input type="checkbox"/> Disable VisioPaD detection while event is active

Event History

Date	Category	Details
03/23/2015 14:09:08	STATUS	Unconfirmed
03/23/2015 14:08:50	TMC NOTIFIED	Waze
03/23/2015 14:05:14	LOCATION	Leon County on I-10 Westbound. At SR-61/US-319/Thomasville Rd

- Instrumented state roads:
 - Confirm Waze event prior to posting to Florida's 511 (FL511) system
- Non-instrumented state roads covered by FL511 system:
 - Post Waze event as “unconfirmed”
- Non-instrumented state roads not covered by FL511 system:
 - Post “floodgate” message for road closures

Analysis



Performance Measures

- Analysis showed that some alert types were not being used in the centers. The filtering was updated to prevent these types from being sent to the Districts

Alert Type	% Converted
ACCIDENT:	5
ACCIDENT:ACCIDENT_MAJOR	5
ACCIDENT:ACCIDENT_MINOR	6
ROAD_CLOSED:ROAD_CLOSED_EVENT	5
WEATHERHAZARD:	1
WEATHERHAZARD:HAZARD_ON_ROAD	1
WEATHERHAZARD:HAZARD_ON_ROAD_CAR_STOPPED	4
WEATHERHAZARD:HAZARD_ON_ROAD_CONSTRUCTION	0
WEATHERHAZARD:HAZARD_ON_ROAD_LANE_CLOSED	0
WEATHERHAZARD:HAZARD_ON_ROAD_OBJECT	4

Evaluate the following as potential performance measures:

- False alarms - instrumented vs. non-instrumented?
- Confidence level correlation- does it correlate to false alarms or confirmed events?
- Event closure comparison
 - When did we close event?
 - When was Waze alert removed from feed?

Next Steps

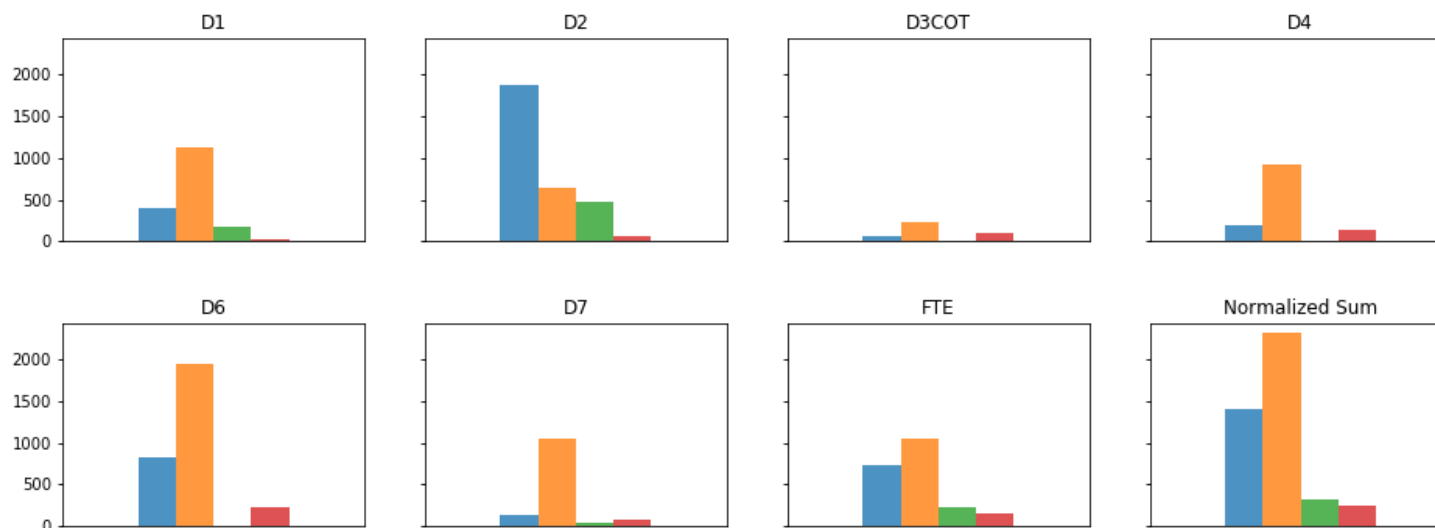
- How many events have multiple Waze reported crashes associated with one SunGuide crash?
 - Difficult to filter
- Incidents consumed by another third party that partners with Waze?

- Alerts are presented to the districts and either dismissed or converted to events

	8/1/16	7/3/17
Alerts in Feed	28648	28280
Sent to Districts	988	781
Conversions	10	68

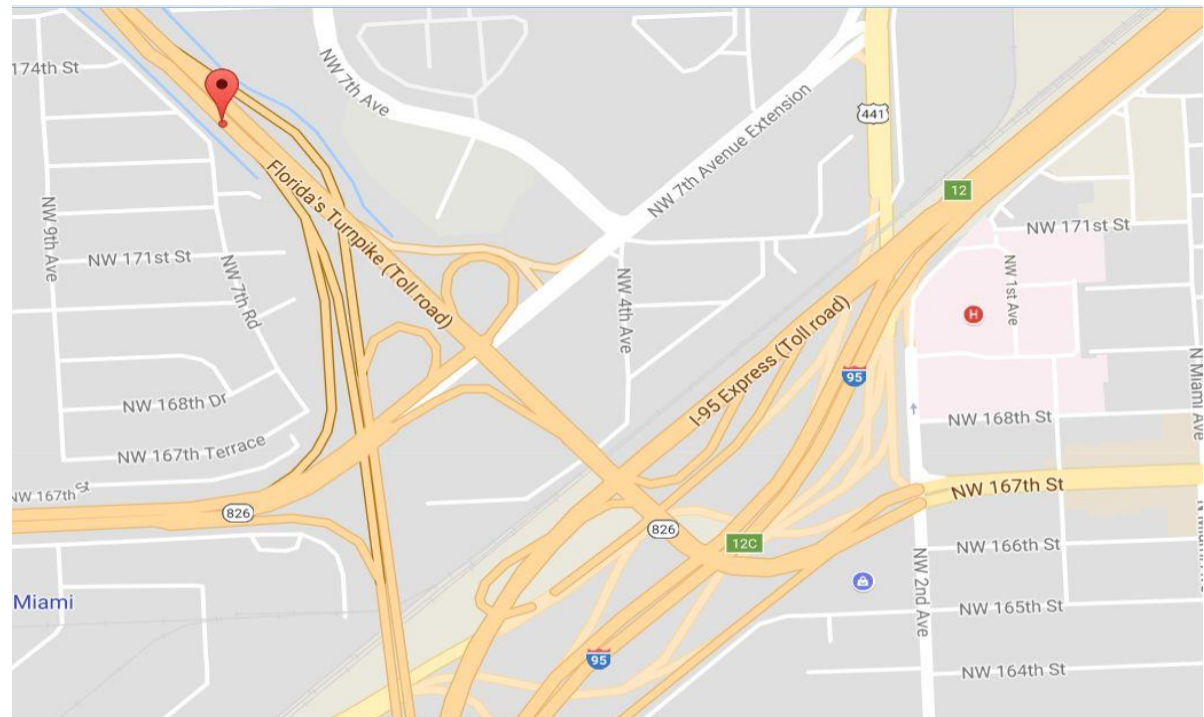
- Alert handling varies between Districts

Waze Alerts by District, Jun 2017



Complex Road Geometry

- Waze (more-or-less) correctly reports “Florida’s Turnpike”
- SunGuide unable to determine roadway, so alert not sent to District





Complex Road Geometry - Future

- Possible Improvements
 - More frequent updates to map shape files
 - Enhanced algorithm that identifies the roadway to look at more properties of the originating alert
 - We already look at latitude, longitude, and magVar

- SunGuide Software Integration Phase 1:
 - Quick implementation
 - Burdensome for operators
- SunGuide Software Integration Phase 2:
 - Released Spring 2016
 - Automated population of event data
 - Improve ease of use for operators
- FDOT data provided to Waze via FL511 third-party data feed and lane closure feed



Questions?

Thank you!

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www.FDOT.gov/traffic