



Technical Memorandum

SunGuide® Software System



SunGuide® Software Waze Phase 2 Concept of Operations

Version 1.0

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List of Acronyms and Abbreviations

511	Florida's Advanced Traveler Information System
C2C	Center-to-Center
CAD.....	Computer Aided Dispatch
CCTV	Closed-Circuit Television
ConOps	Concept of Operations
DMS	Dynamic Message Sign
EM.....	Emergency Management
FDOT	Florida Department of Transportation
FHP	Florida Highway Patrol
GUI.....	Graphical User Interface
ID.....	Identification
IDS	Incident Detection Subsystem
ITS.....	Intelligent Transportation Systems
IV&V	Independent Verification and Validation
RTMC.....	Regional Transportation Management Center
TMC	Transportation Management Center
US	United States
WAN.....	Wide Area Network

1 Introduction

Google Waze is a navigation, entertainment, and social media system where users can receive traffic information and directions, and report incidents using a smartphone. Waze harvests the crowd-sourced input from users and compiles real-time traffic information that is sent out to users through the mobile app. FDOT and Waze have agreed to exchange data. While FDOT provides Waze with access to FDOT's third party data feed, Waze provides FDOT with Waze's incident data feed. This data feed is processed and distributed to the TMCs, ingested by SunGuide® software through C2C, and displayed in a read-only fashion on the operator map for operators to create and publish local events. This was considered phase 1 of the SunGuide® software Waze operations.

1.1 Document Identification

The objective of this ConOps is to document changes to the operations from phase 1 to phase 2. The goal of the changes will be to utilize existing SunGuide® software features in a way that will facilitate the operator processing the Waze events more efficiently and in a more consistent fashion with other incident notification sources such as the FHP CAD data feed.

1.2 Contacts

The following is a list of contacts for the SunGuide® software project:

- Elizabeth Birriel, ITS Section, Traffic Engineering and Operations Office, elizabeth.birriel@dot.state.fl.us, 850-410-5606
- Derek Vollmer, FDOT SunGuide® Project Manager, derek.vollmer@dot.state.fl.us, 850-410-5615
- Clay Packard, Atkins Project Manager, clay.packard@dot.state.fl.us, 850-410-5623
- David Chang, Atkins Project Advisor, david.chang@dot.state.fl.us, 850-410-5622

Additional information on the SunGuide software can be found online at:

<http://sanguidesoftware.com/about-hub>.

2 Current System Situation

The current Waze phase 1 operation provides operators with notification of Waze events, it is a manual process to transfer that information into a SunGuide® software event that can be managed and published.

2.1 Background, Objectives, and Scope

The objective of Waze phase 1 operations was to take the information from Waze, process it, filter it, and provide it to TMC operators in a way that conforms with existing event management operations. Automation and integration into SunGuide® software was not an objective since adding this functionality would delay the major objective of getting Waze in the TMC operations as quickly as possible. A quick solution was necessary. The solution was to build a C2C plug-in that pushed the Waze incidents to the operator map. This used existing SunGuide® software features with a small number of documented steps for operators to follow.

2.2 Operational Constraints

The main constraint is the workload of the operator. Anything added to the workload of the operator, or anything additional that the operator has to keep up with, increases the cost of operations and the possibility of operator error. Steps not requiring human decision making should be automated. After the operator takes necessary action, any unnecessary information should be removed from the operator workstation to reduce information clutter.

Another constraint is the complexity of the operation. New and different procedures add complexity for the operator. Whenever possible, existing operations that can meet the new objectives should be used rather than creating new procedures for each new objective.

2.3 Description of the Current System or Situation

Phase 1 employs a C2C plug-in to download incident alert data from Waze and feed it to TMCs through a C2C Event Status data feed. The SunGuide® software operator map was slightly modified to display Waze events with an indicator. New Waze events have a flashing circle around them for the first two minutes to bring the operator's attention to them. These Waze C2C events are filtered by central office to specific event types that matched best with what the TMCs are currently managing and to the geographic region that each TMC is covering.



Figure 3.1 – Waze Event Icons on the SunGuide® Software Operator Map

Once the icon appears on the operator map, the operator follows the phase 1 operational procedures which include the following actions:

1. If possible, verify the event.
2. If on a covered roadway with defined EM locations, create a SunGuide® software event.
3. Create and publish a response plan for the above event.
4. If on a non-covered roadway with defined EM locations, create a 511 floodgate message.
5. Monitor the Waze event and other information sources to determine if the event is closed.
6. If available information sources confirm that the event is closed, terminate any response plans or floodgates.

A more detailed description of these operations can be found in the documents listed in the appendices.

2.4 User Profiles

- RTMC operators follow the Waze phase 1 operating procedures to process the Waze events on the operator map. Using the information included with these events, they create and publish SunGuide® software event information to DMS and 511.
- Motorists consume 511 information, some of which originates from Waze. They may see the attribution, but otherwise, the 511 system operates the same for Waze and non-Waze events.

2.5 Support Environment

The current system depends on the following components and their corresponding support environments:

- Waze data feed – Google and Waze. The FDOT point of contact with Waze/Google is Elizabeth Birriel (Elizabeth.Birriel@dot.state.fl.us). Derek Vollmer (Derek.Vollmer@dot.state.fl.us) is the backup contact. Waze is responsible for supporting the data feed and ensuring it's availability to FDOT.
- Waze C2C Plug-In – FDOT Central Office. Derek Vollmer (Derek.Vollmer@dot.state.fl.us) is the point of contact. Clay Packard (Clay.Packard@dot.state.fl.us) is the backup contact. The Waze C2C Plug-In is responsible for consuming the Waze data feed, processing and filtering and distributing it to TMCs as a C2C data feed over the ITS WAN.

- ITS WAN – FDOT Central Office. Randy Pierce (Randy.Pierce@dot.state.fl.us) is the point of contact. Frank Deasy (Frank.Deasy@dot.state.fl.us) is the backup contact. The ITS WAN delivers the Waze C2C feed from FDOT Central Office to the Districts.
- SunGuide® Regional Traffic Management Centers – Each ITS Engineer is the point of contact. The RTMCs are responsible for managing the SunGuide® software hosting environment, the operators, TMC operations and systems, and the DMS deployed on the roadway.
- 511 System – This system is responsible for disseminating information to motorists via the 511 phone service, website, and mobile app. Russell Allen (Russell.Allen@dot.state.fl.us) is the point of contact. Jo Ann Oerter (JoAnn.Oerter@atkinsglobal.com) is the backup contact.

3 Justification and Nature of the Changes

There are several improvements to Waze phase 1 operations needed to reduce strain on the operational constraints described in Section 3.2.

3.1 Justification for Changes

Currently, operators are taking many manual steps that could be done for them by the SunGuide® software. These extra steps either increase the cost of operations as additional staff members are hired, or decrease overall quality as existing staff members are over utilized.

These additional steps are documented in a separate set of procedures. These Waze specific procedures are inconsistent with the procedures followed to manage other incident data feeds such as FHP CAD. Having a set of procedures that deviates from the norm, results in an increased likelihood of human error due to misinterpretation and overloading with information.

3.2 Description of the Desired Changes

In phase 1, Waze information is processed beginning with the C2C based Waze events on the operator map. In phase 2, Waze information will be processed by using the IDS. This change will address both of the operational constraints of the phase 1 operations.

An IDS Waze driver will be created to retrieve the Waze information rather than using C2C subscriber to retrieve C2C events. There are two options for implementing this solution.

1. The IDS Waze driver will pull the Waze information directly from Waze. Each SunGuide® software deployment would need access to the Internet to download

the Waze feed. This is similar to how the IDS weather driver operates. All filtering would be configured and executed by the driver.

2. All IDS Waze drivers would pull information from an installed IDS Waze interface server. This is similar to how FHP CAD operates. Filtering could be done at either the interface server or the driver, adding flexibility for TMC specific needs as well as central filtering control.

The IDS subsystem and GUI will need to be modified to process Waze incidents in a similar fashion as FHP CAD incidents. The IDS subsystem and GUI are where many items in the phase 1 operational procedures can be automated. The proposed system will attempt to automate the following actions:

1. Monitoring the operator map for new Waze events
2. Deciding if the Waze event is on a US or state road
3. Creating an event from scratch – either from the map or from the Add Event button
4. Updating the event information with the Waze incident information
5. Creating a floodgate
6. Monitoring the C2C event details dialog for a status change
7. Ignoring icons for Waze C2C events or IDS alerts that have already been processed by the operator
8. Provide attribution to Waze events on an event by event basis

4 Concepts for the Proposed System

4.1 Objectives and Scope

The proposed system and operations will consume the Waze incident feed in an efficient and consistent manner. The system will allow for operators to make decisions and take actions only when necessary. The Waze data feed will be incorporated as an additional secondary notification source. It will be incorporated into SunGuide® software operations in a manner consistent with other notification sources. In this way, existing operational procedures will be changed as little as possible while including the Waze phase 2 operations.

4.2 Operational Policies and Constraints

Events can be verified by a single primary source. Primary sources include but are not limited to CCTV cameras, Road Rangers, FHP officers, and local law enforcement officers. Operators publish information about verified events on US or state roads via DMS and 511.

The Waze data feed is not considered a primary data source. This is because the Waze data is not known or has not been found by the Department to be of the same reliability or timeliness needed to be considered a primary notification source. Thus, the Department will not post information from Waze events without either confirming them with an independent notification source or will post information from Waze events as unconfirmed on roads without instrumentation necessary to confirm the incident. Also, the department will not post Waze incident information for event types not relevant in the context of traffic management.

Events with a single secondary notification are considered unconfirmed. Waze alerts, 511 feedback, and motorists calls are examples of secondary notification sources. Secondary notification sources require additional notification sources to confirm the event.

TMCs will always verify events prior to posting messages on instrumented roadways since these roadways are equipped with assets to quickly verify the presence of an incident. First, the event will be created in SunGuide software. Second, the operator will use ITS equipment to verify whether the event is active or a false alarm. Third, depending on the information gathered from the ITS equipment the operator will either confirm the event as active or set the event to False Alarm. If the event is on a non-instrumented roadway with a single secondary notification, information will be posted as unconfirmed. If there is no EM location defined for a US or state road, a 511 floodgate will be used to publish event information.

4.3 Description of the Proposed System

4.3.1 Waze Data Download Component

In order to handle changes to the Waze feed as quickly as possible, a single, centrally installed component called the Waze Interface Server will download the information from Waze, process and filter the information, store the information in a capture database backed up weekly, and distribute the information via a web services interface to the TMCs. Then, the TMCs will download the Waze data from the Waze Interface Server using a Waze Incident Detection Subsystem driver installed in their respective SunGuide software system deployments.

Filtering will occur by the download component. It will include geofencing around the District's geographic area as well as geofencing around state roadways. The filtering will

be initially setup by the Central Office, but Districts can request fine tuning to the filtering for their Waze incidents that they receive from the downloader.

4.3.2 Incident Detection Subsystem

After the information is retrieved by the IDS Waze Driver, the IDS subsystem is responsible for managing the Waze incidents and alerts. The IDS subsystem generates Waze alerts and facilitates the creation and management of SunGuide® software events.

IDS will create an alert and display it to operators in an alert box similar to the figure below.

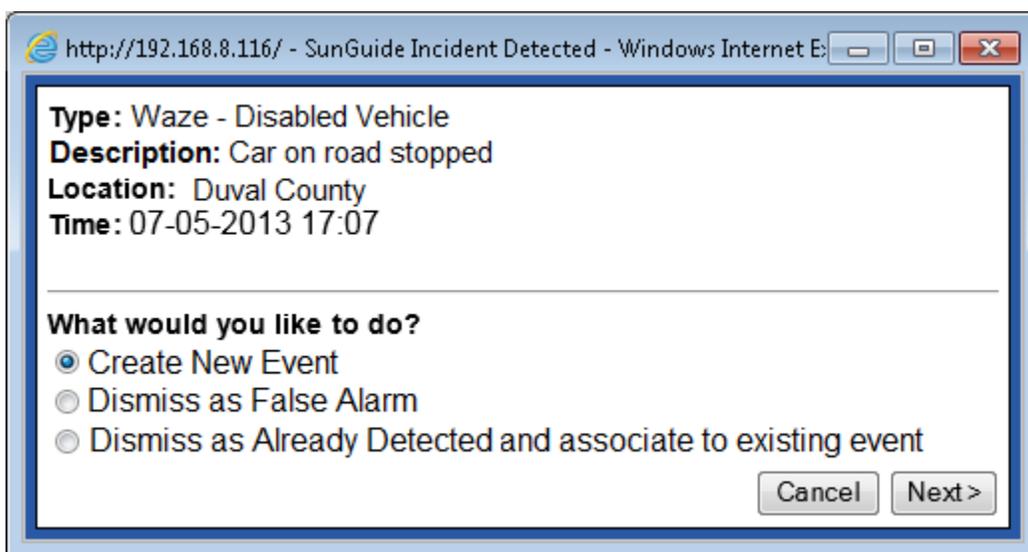


Figure 5.1 – IDS Waze Alert

The alert will flash, beep, and remain in the list until an operator handles and resolves the alert. When the operator begins to handle the alert by clicking on it, an alert handling window will appear to present the operator with the options for resolving the alert. The options for resolving the alert include:

- Creating a new event and associating the alert to the event. This resolves the alert by launching a new event with the following information pre-populated:
 - Event owner as the operator who is handling the alert.
 - Notifier agency set to Waze
 - Notifier contact set to Waze Waze
 - Event type set to match the Waze incident type according to the SunGuide software event and Waze Incident mapping table below

Table 5.1 – SunGuide event and Waze Incident mapping

Waze Incident Type	SunGuide Event Type
Accident	Crash
Road Closed	Road Work – Scheduled
Road Closed: Road Closed Event	Road Work – Emergency
Hazard	Debris on Roadway
Weather Hazard	Weather
Car Stopped	Disabled Vehicle

- Event location set to the location specified by the Waze incident.
- Event status set to unconfirmed
- All information available from the Waze Incident inserted into the event chronology so that it is available for additional research.
- Dismissing the alert as already detected and associating the alert to an existing event. This option will require the user to select an event to associate the alert to prior to resolving.
- Dismissing the alert as a False Alarm

Once the alert is resolved, the following subsequent actions will be taken. Any change to the Waze incident will cause the associated event to update its chronology entry. If the status of the event changes from open to closed, an updated alert will appear in the alert box for an operator to handle. Clicking this alert will launch an Updated Alert Handling Dialog. The Dialog will give the following options:

- Update Event <event number> with one of the following updates:
 - event status: <updated event status>
 - lane blockage: <updated lane blockage>
- Dismiss Update as Already Detected
- Dismiss Update as False Alarm
 - Update confirmed to be inaccurate

4.3.3 Event Management Subsystem Notifier Contact

Event management subsystem will largely operate without any changes. An additional Agency, an Agency contact of Waze and Waze respectively should already be configured in the system to be used for Waze events. When Waze events are published to 511, having Waze as the agency and agency contact will let the EM subsystem know

to set Waze as the third party. This action of setting the third party to Waze is what lets the 511 system know that the event should be attributed to Waze.

4.3.4 Operator Map and Find on Map

The operator map will continue to display Waze icons in Waze phase 2. This feature is a carryover from Waze phase 1. While the alert is not yet handled, the Waze alert will appear on the map as an event icon with a red Waze indicator and with a red circle flashing around it (as shown earlier in Figure 3.1). Once the Waze alert is handled, the Waze alert icon will disappear. If an event is created from the alert, the Waze icon will be replaced by the SunGuide® software event icon. If the event icon is associated to a Waze event, the event icon will have the Waze indicator.

When Waze incident update alerts come in and are unhandled in the alert box, the associated event will flash to indicate an alert update associated to this event needs to be handled.

Each new Waze incident alert and Waze update alert will have a right-click menu item called “Find on Map”. When the “Find on Map” item is invoked, the map will center at the Waze alert or associated event and circle the icon in a manner consistent with the “Find on Map” function for other items in the SunGuide® software.

Operators will be able to open the alarm handling dialog for new and updated Waze alarms by left clicking the Waze icon on the operator map or in the alert list.

4.3.5 Event Management Operations

Waze events will be managed as events having a secondary notification source. The operational policies and constraints in section 5.2 will be followed using existing event management procedures already established in the Districts.

4.4 User Involvement and Interaction

The RTMC operators will be the primary users of the system during operations. They will interact with the Waze alerts, manage the resulting SunGuide® software events, and publish information as specified in their event management procedures.

4.5 Support Environment

The Waze support environment will utilize the existing support environment used for RTMC operations and SunGuide® Software Support, and the Central Office.

5 Operational Scenarios

The following scenarios describe how the proposed Waze phase 2 operations after initial setup and configuration is complete.

5.1 Waze-First Instrumented Roadway Event Scenario

The operator sees a new alert in the alert box. The operator right-clicks on the alert and clicks on the “Find on Map” context menu item. The map centers over the Waze alert icon. It is a disabled vehicle icon with a Waze visual indicator (large Red ‘W’) and has a flashing red circle around it. The operator decides to handle this as an unconfirmed initial notification since there are no other existing SunGuide software events nearby on the map. The operator left clicks on the alert, and the alert handling window appears. The alert handling window presents all of the information it can from the Waze data feed incident and asks the operator what they would like to do. The operator elects to create a new event, so the operator selects that option and click’s the “Next” button. An event is created with the operator as the owner, Waze as the notifying agency, Waze as the notifying contact, unconfirmed as the status, disabled vehicle as the event type, and I-10 before Thomasville Road as the location. The operator then goes back to the map and visually locates the nearest CCTV camera and launches that camera in a new video on desktop dialog. After panning around with the camera, the operator sees the vehicle parked on the side of the road. The operator sets the event status to “Confirmed”, dispatches a Road Ranger, generates a response plan, and publishes the response plan. The operator continues to monitor the event until the disabled vehicle is removed from the scene using existing event management procedures.

Just as the operator notices the Road Ranger towing the vehicle away, a Waze update alert comes in that the event is closed. The operator clicks on the alert update, and the alert handling window appears asking the operator if the event status should be changed to “Closed”. The operator selects the option to update the event, and a confirmation box pops up warning the operator that there is a response plan open for the event. The Operator clicks yes to confirm that the response plan should be closed. The response plan is terminated and the event is closed by the system.

5.2 FDOT-First instrumented Event Scenario

The RTMC receives an FHP CAD alert of some debris on roadway on I-75. The operator handles the alert and manages the event using existing event management procedures. Next, a Waze event pops onto the map. It is located right near that location, and after the operator clicks on the Waze icon, the alert handler window appears and says that it is also a debris event type. The operator dismisses the Waze event as already detected, and associates it to the first event created from the FHP CAD alert. The operator continues to monitor the event using existing event management procedures.

5.3 FDOT-First Non-Instrumented Event Scenario

The RTMC receives a call from a motorist that there is a crash on US-90. The operator creates an unconfirmed event with a motorist as the notifying contact and notifies FHP of the possible incident. A new Waze alert appears in the alert box and on the map just

downstream of the alert. The operator clicks on the alert and the alert handling window appears. The operator decides that this is the same event that the motorist called in about since it is the same event type at just about the same location. The operator chooses the option to associate the alert to the existing crash event and clicks next. The operator then receives an alert from FHP CAD system that an officer has been dispatched to the scene. The operator similarly associates the FHP CAD alert to the crash event. The operator sets the event status to “Confirmed” and executes the existing event management procedures for publishing information about the event. Another FHP CAD alert comes in with information regarding the scene being cleared and FHP departing the scene. The operator terminates the response plan and closes the event. A Waze “Closed” alert comes into the system. Since this Waze alert ID was associated to an existing event that was cleared and closed, the system automatically resolves the alert and dismisses it as already detected.

6 Future Considerations

The following are potentials enhancements that are not part of this Waze Phase 2 effort, but can be considered in the future.

6.1.1 Floodgate Response plan

To assist operators in the building of floodgates, the SunGuide software could be enhanced to add a floodgate as a response plan item. The system could build a floodgate as part of a response plan for an event without a nearby EM location.

6.1.2 Phonetic Spelling of Locations and Spoken Event Information

To support the automatic creation of floodgates in a response plan or wherever text to speech may be used including highway advisory radios, the system could add a phonetic spelling.

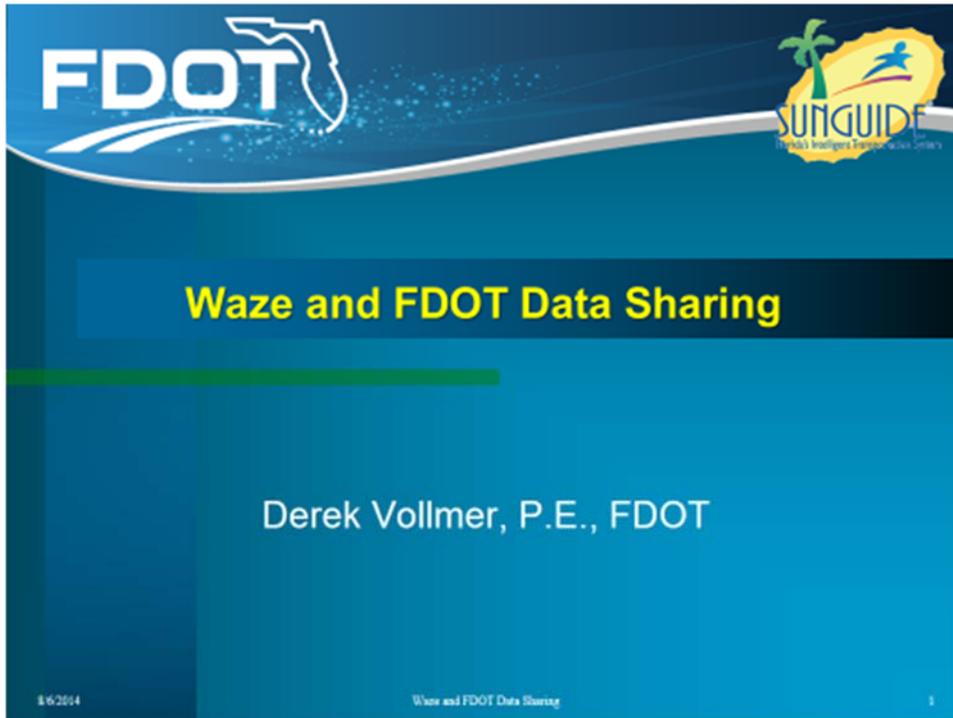
7 Summary of Impacts

Handling another secondary notification source has significantly increased workload on operators. Implementing this efficient, semi-automated, and consistent IDS-based solution will lighten, but not remove, the additional workload.

The Waze data feed will provide FDOT with additional coverage of non-instrumented US and state roads. This additional coverage will allow FDOT to not only provide better service to users of the 511 system, but also dispatch responders to events that may have never been detected otherwise.

Appendix A

Waze IDS Alerts Presentation



Slide 1 features the FDOT logo on the left and the SunGuide logo on the right. The title "Waze and FDOT Data Sharing" is centered in a yellow box. Below the title, the presenter's name "Derek Vollmer, P.E., FDOT" is displayed. The slide includes a date "8/6/2014" in the bottom left, the title "Waze and FDOT Data Sharing" in the bottom center, and a page number "1" in the bottom right.

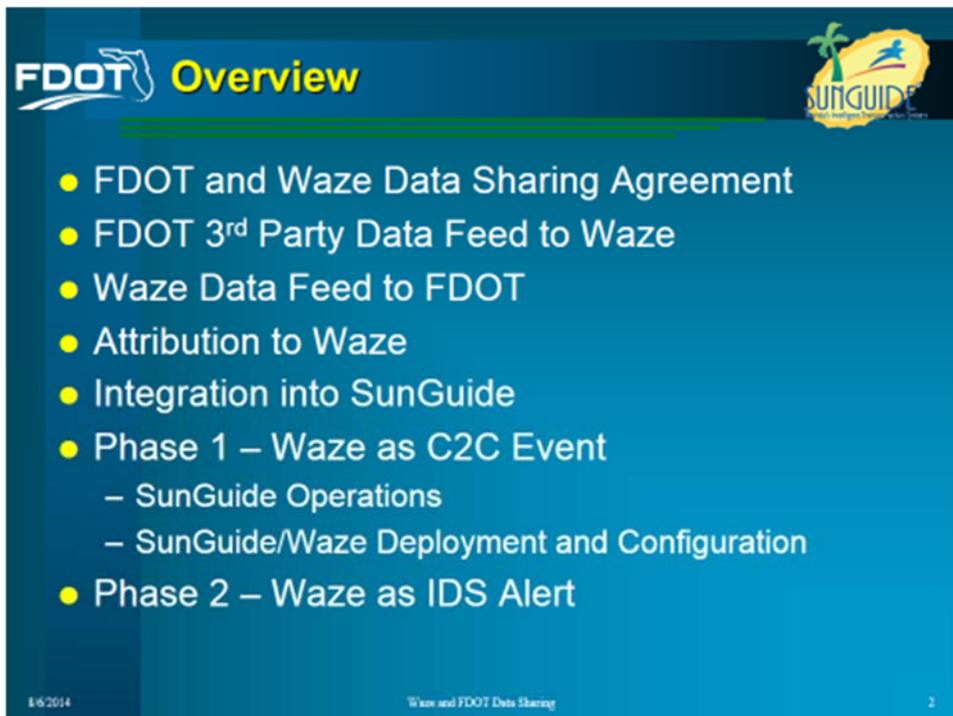
FDOT

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Waze and FDOT Data Sharing

Derek Vollmer, P.E., FDOT

8/6/2014 Waze and FDOT Data Sharing 1



Slide 2 features the FDOT logo on the left and the SunGuide logo on the right. The title "FDOT Overview" is centered at the top. Below the title, a bulleted list outlines the presentation's content. The slide includes a date "8/6/2014" in the bottom left, the title "Waze and FDOT Data Sharing" in the bottom center, and a page number "2" in the bottom right.

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FDOT Overview

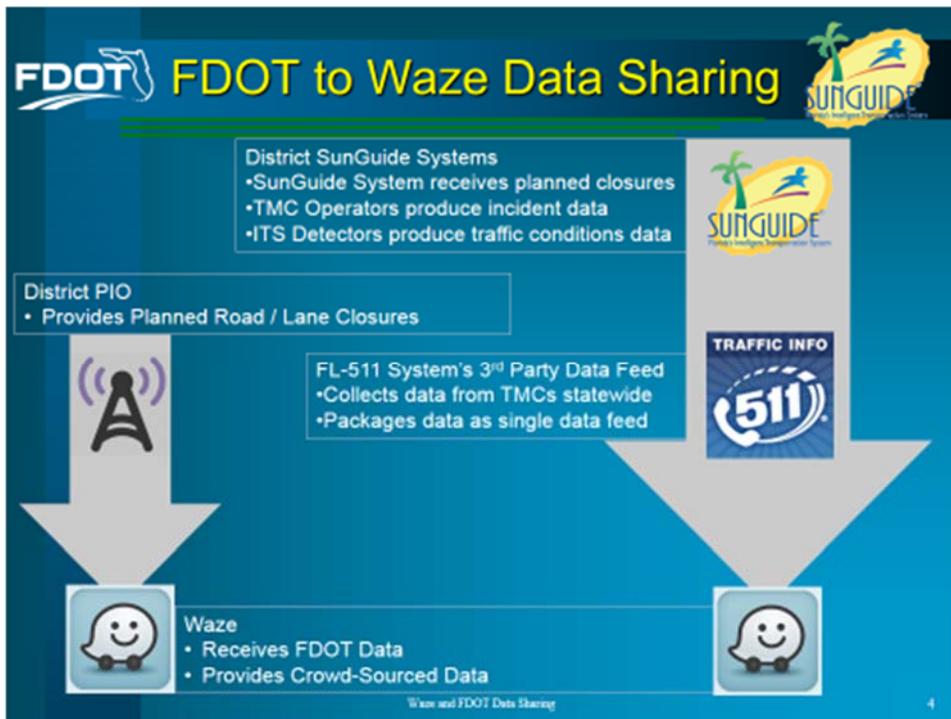
- FDOT and Waze Data Sharing Agreement
- FDOT 3rd Party Data Feed to Waze
- Waze Data Feed to FDOT
- Attribution to Waze
- Integration into SunGuide
- Phase 1 – Waze as C2C Event
 - SunGuide Operations
 - SunGuide/Waze Deployment and Configuration
- Phase 2 – Waze as IDS Alert

8/6/2014 Waze and FDOT Data Sharing 2

FDOT FDOT Traffic Data to Waze

- Waze is receiving FDOT Traffic Data
- ITS real-time traffic information
 - FL-ATIS 3rd Party Data Feed provided since 6/5
- Road Closure Information
 - Produced by District PIO
 - Includes planned road / lane closures
 - Useful for operators to be aware
 - Can be incorporated as SunGuide planned event

8/6/2014 Waze and FDOT Data Sharing 3





FDOT 3rd Party Data Feed

- Provides statewide real-time data
 - Sent by Traffic Management Centers to FL-ATIS
- Date Types Include:
 - Floodgates
 - Traffic Events
 - Camera Images
 - Dynamic Message Sign Messages
 - Traffic Speed
 - Travel Times

8/6/2014 Waze and FDOT Data Sharing 5



Waze Incident Data Feed to FDOT

- Waze Provides Crowd Source Data
 - Updated every 5-15 minutes
 - Contains traffic alerts similar to SunGuide events/alerts
- Central Office processes Waze Data at TERL
 - Filtered on event type, road type, confidence
 - Each TMC gets events from own region by county
- District TMCs receive, verify, and publish Waze events
 - Operator creates, verifies, and manages local SunGuide EM event
 - Operator publishes local event to FL-ATIS

8/6/2014 Waze and FDOT Data Sharing 6

FDOT Waze to FDOT Data Sharing

The diagram illustrates the data flow process. It starts with 'Waze Alerts' (represented by a smiley face icon), which are sent to the 'Waze C2C Plug-In' (represented by a blue plug icon). This plug-in converts the feed into C2C Status Event Objects, filters them by event type and confidence, and distributes them to TMCs based on geographic location. These events then pass through 'SunGuide Software' (represented by the SunGuide logo), which displays remote C2C Waze events as read-only, allows operators to verify events and create SunGuide events, sets Waze as the notifying agency, and publishes local Waze events to FL-ATIS. Finally, the 'FL-ATIS 511 System' (represented by the 511 logo) processes these events normally and adds attribution to Waze events on IVR and website. The SunGuide logo is also shown in a green arrow pointing downwards, indicating the flow of data.

- Waze Alerts**
 - Crowd-sourced traffic alerts
 - Waze feed sent to FDOT Central Office
- Waze C2C Plug-In**
 - Converts Waze feed to C2C Status Event Objects
 - Filters based on event types and report confidence
 - Distributes to TMCs based on geographic location
- SunGuide Software**
 - Displays Remote C2C Waze Events as read-only
 - Operators verify events and create SunGuide Events
 - Operators set Waze as Notifying Agency
 - Operators publish local Waze events to FL-ATIS
- FL-ATIS 511 System**
 - Processes events normally
 - Adds attribution to Waze events on IVR and website

8/6/2014 Waze and FDOT Data Sharing 7

FDOT Waze Attribution to FL-ATIS

- Events set to have Waze as Notifying Agency
- SunGuide labels these events for attribution
- C2C Event includes new attribution field
<ThirdParty>Waze</ThirdParty>
- Operator publishes event normally
- FL-ATIS reads label and attributes Waze
 - Phase 1a: Catch-all statement
 - “Some Data contributed by Waze” on website and IVR
 - Phase 1b: Event specific attribution
 - To Be Designed (both website and IVR)

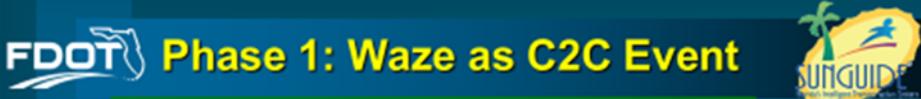
8/6/2014 Waze and FDOT Data Sharing 8



FDOT Two Phased Integration

- Phase 1 – Waze C2C Plug-In
 - Waze alerts appear as remote C2C Events
 - No automation – Operators create new, local events
 - Event published to FL-ATIS via response plan
- Phase 2 – IDS Alert
 - More Operator/User -friendly
 - Semi-automated workflow
 - Operator still creates SunGuide event and attempts to verify
 - Event published to FL-ATIS via response plan
 - Events published as unconfirmed if operator unable to verify
 - Several months turnaround

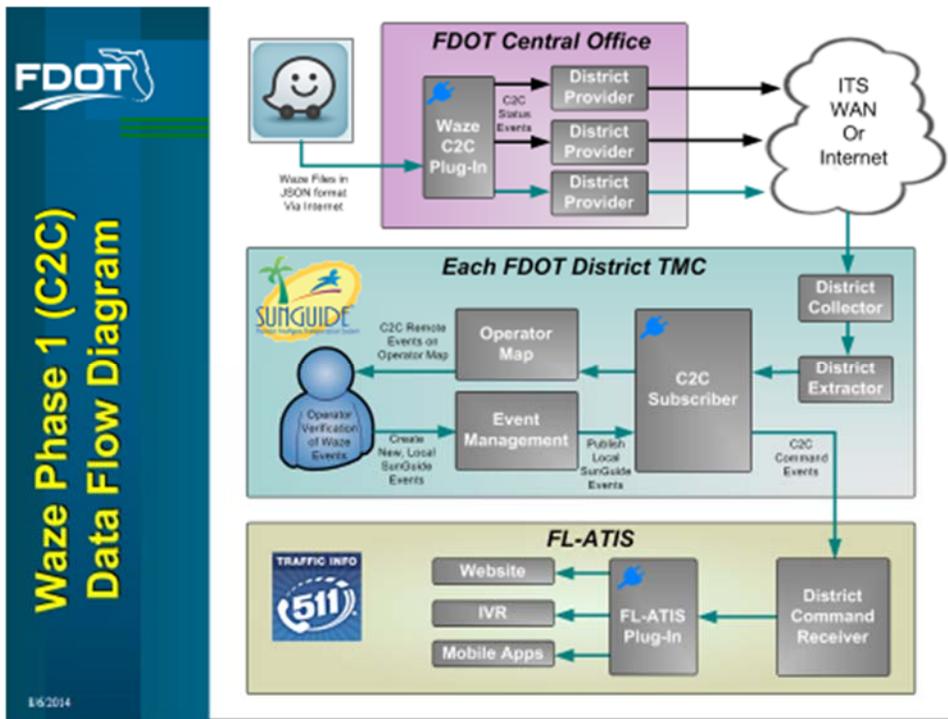
8/6/2014 Waze and FDOT Data Sharing 9



FDOT Phase 1: Waze as C2C Event

- Send Waze events to SunGuide TMCs
 - Use existing Center to Center (C2C) data feed
- FDOT developed Waze C2C plug-in
 - Waze C2C Plugin downloads data
 - Waze data feed filtered consistently
 - Events filtered by county for each District/TMC
- TMCs connect to Waze C2C Plugin at TERL
 - ITS WAN
 - Internet available as alternate path to C2C Plugin

8/6/2014 Waze and FDOT Data Sharing 10



SunGuide Operations – Phase 1 Waze C2C Events

- Waze C2C Events appear on Operator Map
 - Waze C2C events have Waze as center ID and are read-only
- On covered routes (with EM locations configured):
 - Click C2C Event to open and monitor C2C Event Details Dialog
 - Create "UNCONFIRMED" SunGuide event
 - Confirm Waze events
 - If event is confirmed, change event from unconfirmed to confirmed
 - If unable to confirm, leave event in as unconfirmed
 - Close event when C2C Event Details Dialog closes, icon disappears, or other indication/verification of normal conditions is available
- On uncovered routes:
 - Post floodgate if event is a major traffic incident. (ie – more than 50% of roadway closed, full closure, etc.)
 - State in floodgate that event is unconfirmed
 - Confirm Waze event
 - If event is confirmed, change floodgate to remove unconfirmed status
 - If event is unable to be confirmed, leave floodgate as is

8/6/2014 Waze and FDOT Data Sharing 12

FDOT Event Management Operations for Waze Attribution on covered routes

- Operator creates a local, SunGuide, EM event
 - Phase 1 – Create new event manually
 - Phase 2 – IDS alert handler
- Use Waze as the Notifying Agency
- Use Waze Waze as the Notifying Contact
- Manage the event normally
- Set to Unconfirmed until event is verified
- Event will be published with Waze attribution flag

Add New Event

Event Type:	Crash
Notifying Agency:	Waze
Notifying Contact:	Waze Waze
Status:	Unconfirmed

Add Event Cancel

8/6/2014 Waze and FDOT Data Sharing 13

FDOT Waze C2C Events on Map

- Waze C2C Event icons on Operator Map
 - Mouse hover box shows Waze attribution to operator



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FDOT **Waze C2C Events Dialog**



- Waze C2C Event Detail Pop-up when icon is clicked
- Event Status will be "Closed" when Waze Alert is removed from the feed – no other closed indication for C2C Events

C2C Event Details: 1063143143 [Waze] - Windows Internet Explorer

General

Description: WEATHERHAZARD | HAZARD_ON_SHOULDER_CAR_STOPPED | No Desc
 Event Status: Unconfirmed
 Lanes Affected: None
 Road Conditions: N/A
 Weather Conditions: N/A
 Severity: Unknown
 Type: Unknown

Timing

Start Time: 07-18-2014 15:56:19
 End Time: N/A

Primary Location

Latitude: 29.143282
 Longitude: -82.184842
 Roadway: I-75 N
 Cross Street: N/A
 Direction: N/A

FDOT **Flag event for Waze Attribution: Set Notifying Agency/Contact to Waze**



Event # 1931 [collapse all] [expand all]

Administrative Details [Release Ownership] [Save]

Operator: cpackard
 Date/Time Added: 5/14/2013 7:21
 Status: Active
 Status Last Updated: 5/14/2013 12:30

▶ **Contacts** There are currently no contacts.

Impact on Roadways [Save]

▶ **Event Location / Congestion** Leon on I-10 Eastbound, 10000 ft Al MM 211 No Congestion

▶ **Lane Blockage** All Lanes (of 2 Lanes) Blocked

Anticipated Clearance Time: _____ minutes
 FL-ATIS Incident Severity: Major

Reporting & Dispatch [Save]

Organization: TERL TMC
 Notifying Agency: Waze
 Notifier Contact: Waze Waze

▶ **Vehicle(s) Dispatch** There are currently no dispatched vehicles.

▶ **Procedural Error** There are currently no errors.



FDOT Phase 1 Deployment Overview

- Establish Connectivity to Central Office Server
- Configure SunGuide to allow Waze Attribution
- Configure Local Collector to receive Waze Events
 - Use existing Collector that is receiving floodgates
- Install C2C Subscriber Hotfix
 - Specific versions for 6.0 Patch 2 and Release 5.1.1
 - Fixes Footprint 2776 – C2C Event Icons on Map
 - Follow instructions provided in hotfix

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FDOT Verify Connectivity to Central Office Server

- If ITS WAN is available, use it, else use Internet
- Contact Central Office for ITS WAN or Internet IP Address of the Central Office C2C server
- Provide Central Office with the IP Address of the District/TMC C2C Server
- Coordinate with network team to allow inbound HTTP port 80 from Central Office C2C Server to District/TMC C2C server
- Coordinate with Central Office to allow inbound HTTP port 80 from local District/TMC C2C server to Central Office C2C Server

8/6/2014 Waze and FDOT Data Sharing 18

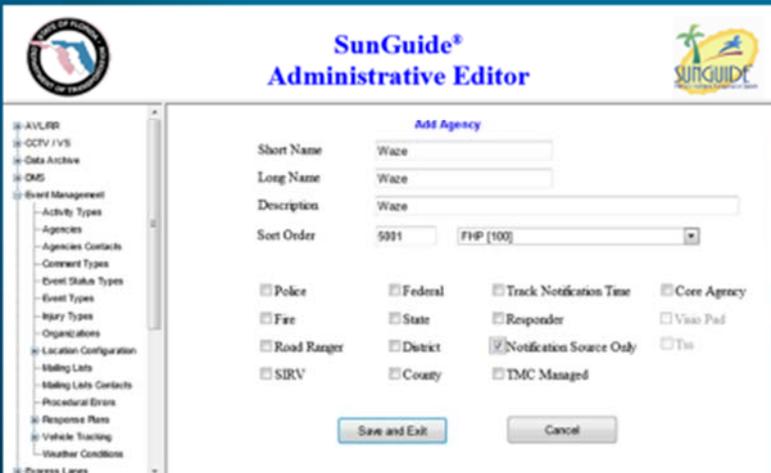
FDOT **Establish Connectivity to Central Office Server**

- Open browser on C2C Server & browse to remote C2C URL:
- <http://w.x.y.z/D1/Collector/CollectorServer.asmx>
 - Note: actual IP address and URL not to be used – contact CO for actual IP and URL
- If you see SOAP XML, proceed to next step.
- If you see “page not found”, then troubleshoot connectivity
- Perform test in both directions between servers

8/6/2014 Waze and FDOT Data Sharing 19

FDOT **SunGuide Configuration for Waze Attribution: Agency**

- Open Admin Editor → Event Management → Agencies
- Click Add, enter parameters below, click save



SunGuide® Administrative Editor

Add Agency

Short Name: Waze

Long Name: Waze

Description: Waze

Set Order: 5001 FHP (100)

Police Federal Track Notification Time Core Agency

Fire State Responder Visio Pad

Road Ranger District Notification Source Only Tiv

SIRV County TMC Managed

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FDOT SunGuide Configuration for Waze Attribution: Agency Contact

- Open Admin Editor → Event Management → Agency Contacts
- Click Add, enter parameters below, click save

SunGuide® Administrative Editor

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

SUNGUIDE

Event Management

- Activity Types
- Agencies
- Agencies Contacts
- Comment Types
- Event Status Types
- Event Types
- Injury Types
- Organizations
- Location Configuration
- Mailing Lists
- Mailing Lists Contacts
- Procedural Errors
- Release Plans

Edit Agency Contacts

Contact List

Waze Waze (waze@waze.com)

Agency: Waze First Name * Waze

E-Mail * waze@waze.com Last Name * Waze

Phone * N/A Mobile * N/A

Pager Fax

Sensitive information

* indicates required field. If phone information is unavailable, enter "N/A"

Add Modify Delete Cancel

FDOT C2C Collector Configuration

- Need Extractor to include eventData in subscriptions
 - Open web.config file on C2C server (found in C:\inetpub\wwwroot\...\Extractor)
 - Add "eventData" into subscriptionDataTypes node if needed
- Need Collector to include both eventData and include Waze Provider URL
 - Add "eventData" to subscriptionsDataTypes node as above
 - Also add Central Office hosted Provider URL to serverList

8/6/2014 Waze and FDOT Data Sharing 22



Phase 2: Waze as IDS Alert



- Incident Alerts Allow Operator Verification
- Operates Consistently as FHP CAD
- Presents Incident Information to Operator Map
- Operator Handles Alert with following options:
 - Creates new event or secondary EM event
 - alert info auto-populated into the event
 - Dismiss as false alarm or as already detected
- Operator Manages local SunGuide event
 - Same as in Phase 1
 - Operator attempts to verify, manage, and publish to 511

8/6/2014 Waze and FDOT Data Sharing 23

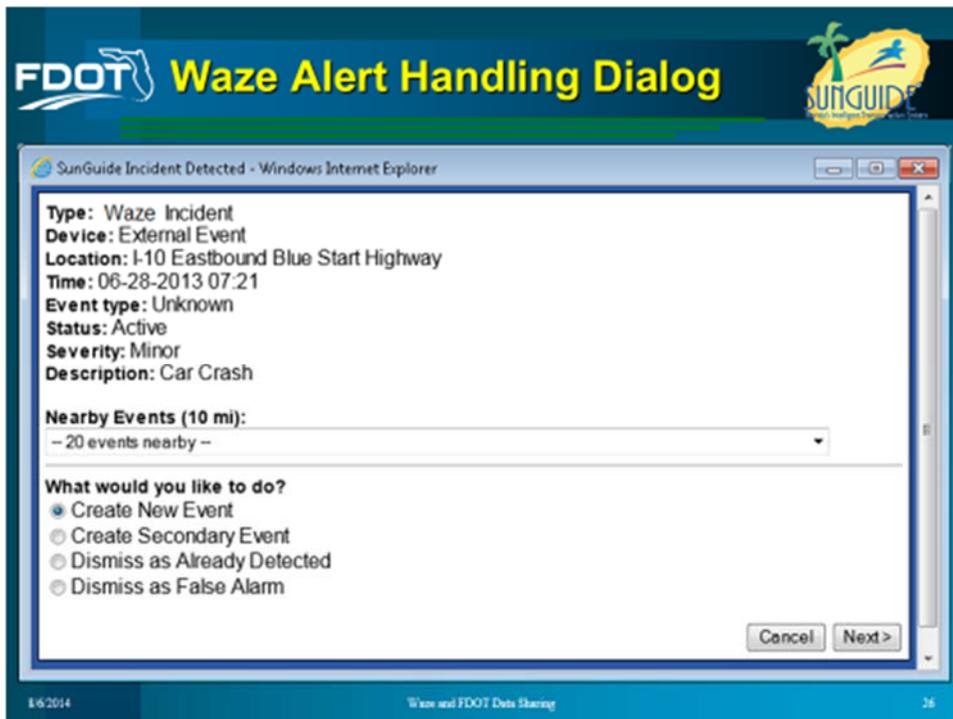
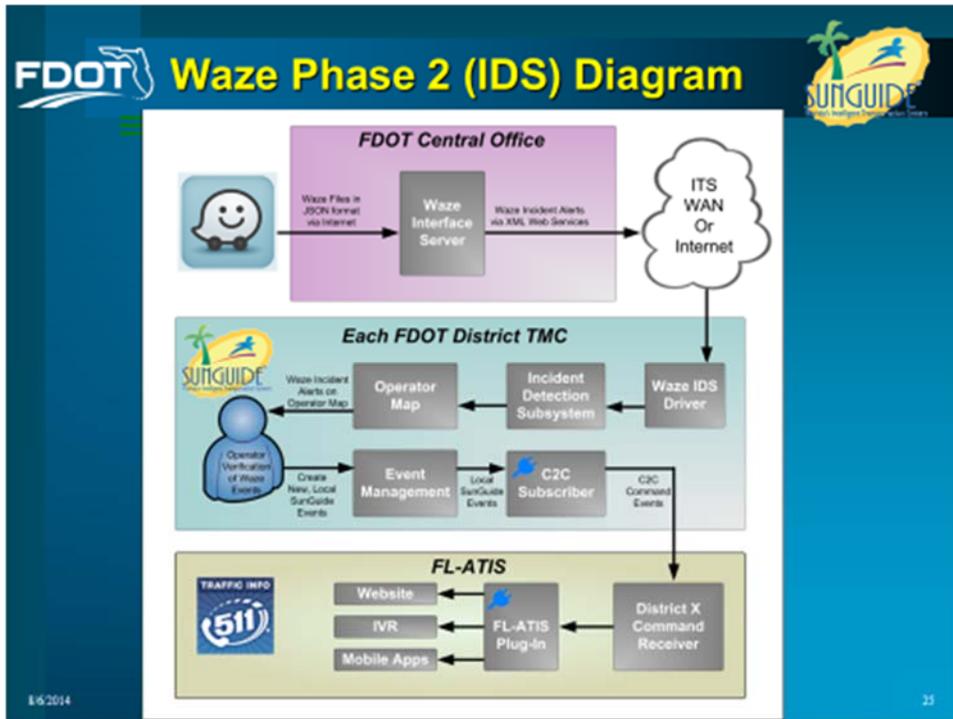


Waze Interface Server / IDS Driver



- Waze Plug-In replaced by Waze Interface Server
 - Single download from Waze for statewide use
 - Same Filters and Processing as Waze Plug-In
 - Additionally may include Waze Jams as SunGuide congestion events
- IDS Driver gets Waze XML from Interface Server
 - Each District installs IDS Waze Driver
 - Configure Driver to use same IP address as District Collectors hosted by Central Office
- IDS Produce alerts to operator
 - New, updated, and removed notifications in alert box
 - More Operator/User-friendly and Semi-automatic
 - Local Event created and managed
 - Same procedure to publish to FL-ATIS

8/6/2014 Waze and FDOT Data Sharing 24





QUESTIONS?

Derek Vollmer, P.E., FDOT
Derek.Vollmer@dot.state.fl.us

8/6/2014 Waze and FDOT Data Sharing 27

Appendix B

Technical Memorandum



SunGuide® Software System



Waze Phase 1 Standard Operation Procedures

Version 1.0

August 28, 2014

Prepared for:

*Florida Department of Transportation
Intelligent Transportation Systems Program
605 Suwannee Street, M.S. 90
Tallahassee, Florida 32399-0450
(850) 410-5600*

1 Introduction

The Florida Department of Transportation's (FDOT) traffic management centers (TMC) assist in monitoring Florida's state roadways. TMCs access several sources of traffic data through instrumentation and data feeds. The data is processed by SunGuide, presented to operators, and used by operators to monitor roadways and support the operation of the roadway through information dissemination.

One of the sources of traffic information comes from Waze. Waze data contains crowd-sourced incidents that suggest where traffic problems may arise. The data will be presented to operators for them to take action in monitoring and managing the potential incident using the SunGuide TMC software. The following standard operating procedures detail how operators should interact with data from Waze.

Phase 1 Waze Operations uses a rapidly integrated solution using existing components including the Center to Center (C2C) infrastructure and remote C2C Events graphical user interface. Phase 2 will use are more user friendly, semi-automated solution that will take a few months to design, review, and deploy. Documentation for Phase 2 operations will follow the Phase 1 roll-out.

2 Waze Data in SunGuide

This section describes information about the Waze Incident Data in SunGuide as a background needed for the procedures.

2.1 Waze Data as Notification Source

Primary notification sources include Cameras, Road Rangers, FHP, and local law enforcement. Secondary notification sources include 511 feedback and motorists calls. Waze events are a new secondary notification source.

An incident is considered confirmed when at least one primary source or multiple secondary sources are available for the given incident.

2.2 Waze Data Type

Waze data contains crowd-sourced incidents. Waze incidents include the following information:

- Incident Type (crash, congestion, closure, hazard, weather)
- Timestamp
- Location
 - Latitude and Longitude
 - City
 - Roadway name
- Roadway type (Freeway, Highway, Primary, Secondary, Street, Pedestrian, Trail)

- Confidence level (from 0 to 5)
- Description (typed by user)

2.3 Filtering

Waze incidents are filtered in the following manner:

- All incidents with a road type of 4X4 Trail, Trail, or Pedestrian are filtered out and not sent to the TMC.
- All incidents with confidence level of 0-3 are filtered out and not sent to the TMC.
- All incidents outside of a county that is covered by the TMC are filtered out and not sent to the TMC.
- All incidents with an incident type of POLICEMAN and CHIT_CHAT are filtered out and not sent to the TMC.

2.4 SunGuide Integration

Waze incidents are transmitted to SunGuide software as remote C2C Events through the status channel of Center to Center. The SunGuide software operator map will display the icons with a visual Waze indicator to allow operators to clearly see which event icons are for Waze events and which ones are not. Additionally, the icons flash for the first two minutes they are displayed on the map.



Figure 1: Waze icon with indicator, both with and without flashing alert circle.

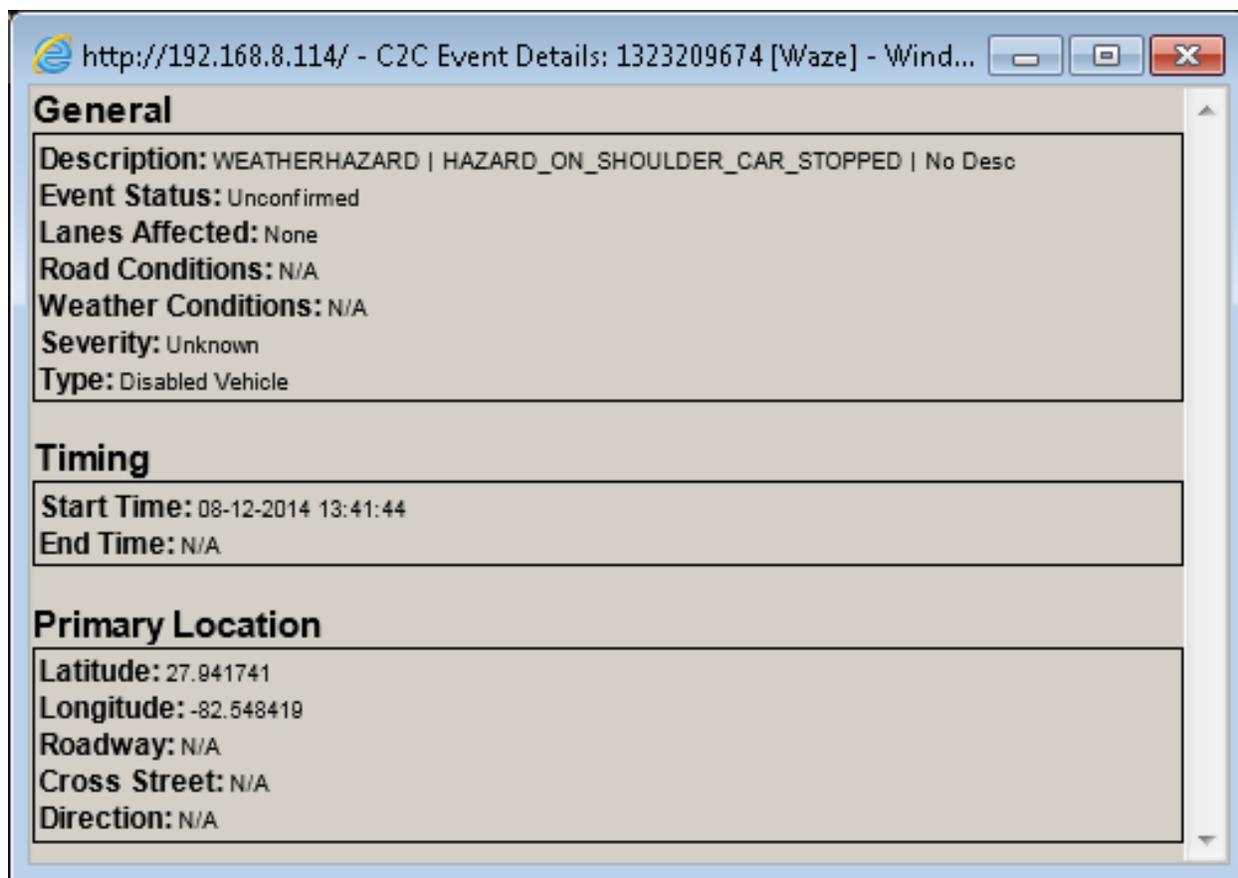


Figure 2: C2C Event Details Dialog.

The Waze C2C Event Details Dialog opens when a Waze C2C event icon is clicked. The Dialog includes the following useful information:

- Description: This field contains the Waze event type and any text entered by the user.
- Event Status: This field is always “Unconfirmed” unless the event no longer appears in the Waze data feed. In that case, the status will be closed.
- Type: This field contains the recommended SunGuide event type.
- Start Time: The time when the event first appeared in the Waze data feed.
- End Time: The time when the event is removed from the Waze data feed.
- Latitude and Longitude: The exact location that the event was reported from.
- Roadway: This is a user entered field that contains the roadway of the event, but is not always populated.

3 Waze Incident Phase 1 Procedures

The following procedures detail how the operator will interact with Waze events. The first sub-section provides general procedures for all Waze Incidents, while the last three sub-sections provide procedures for a sub-set of Waze Incidents based on which roadway the incident is located.

3.1 Waze Incident General Procedure

The following procedures apply to all Waze Incidents.

3.1.1 Identify new Waze Data Feed Incidents

The best way for the operator to be notified of new Waze Data Feed incidents is to notice new Waze C2C Event Icons appearing on the map. In order for icons to appear, the operator map must be zoomed out and panned to show the entire geographic region covered by the TMC.

Waze C2C event icons are surrounded by a blinking red circle for two minutes after they first appear. This behaviour should assist the operator in identifying new events.

3.1.2 Monitor Waze C2C Event

Click Waze C2C Event Icon to open and monitor Waze C2C Event Details Dialog.

Monitor Waze C2C Event Icon for disappearance and keep Waze C2C Event Details Dialog open in order to receive event status update. It will change to closed when removed from Waze Feed.

3.1.2.1 Determine if Waze C2C Event is candidate for managing

If the event is not a duplicate, already reported, or on a US or state roadway, it is a candidate for managing.

3.1.2.2 Determine Appropriate Roadway Classification

The determination of the roadway classification is dependent upon the location of the Waze C2C event.

First, the roadway that the event is reported on must be identified. If the Waze Event Details Dialog contains a roadway, it and the latitude and longitude should be used together to best determine the events locations. If the roadway is not present, the latitude and longitude should be used on their own to determine roadway.

Second, the operator must determine whether or not the roadway found in the previous step has an EM location in the system and whether or not the roadway is instrumented.

Once this determination is made, the operator will know which of the following set of procedures to follow.

3.3 Waze Incident at an Event Management location with Instrumentation

1. Create Unconfirmed Event with Waze as the notifier.
2. Attempt to confirm Waze event with primary and secondary sources.
3. If the event is confirmed, continue to step 4. If not, go back to step 2.
4. Change event status to “confirmed”.
5. Update event information.
6. If the event is still active, publish the event and go back to step 5. If not, unpublish and close the event.

3.4 Waze Incident at an Event Management location without Instrumentation

1. Create Unconfirmed Event with Waze as the notifier.
2. Publish event as “unconfirmed” to FL-511.
3. Monitor for additional information and manage the event.
4. If the TMC has received new information about the incident, continue to step 5. If not, go back to step 3.
5. If the event is still active, update the event with additional information, set the status to “confirmed” if it is “unconfirmed”, republish the event to FL-511, and go back to step 3. If not, close the event.

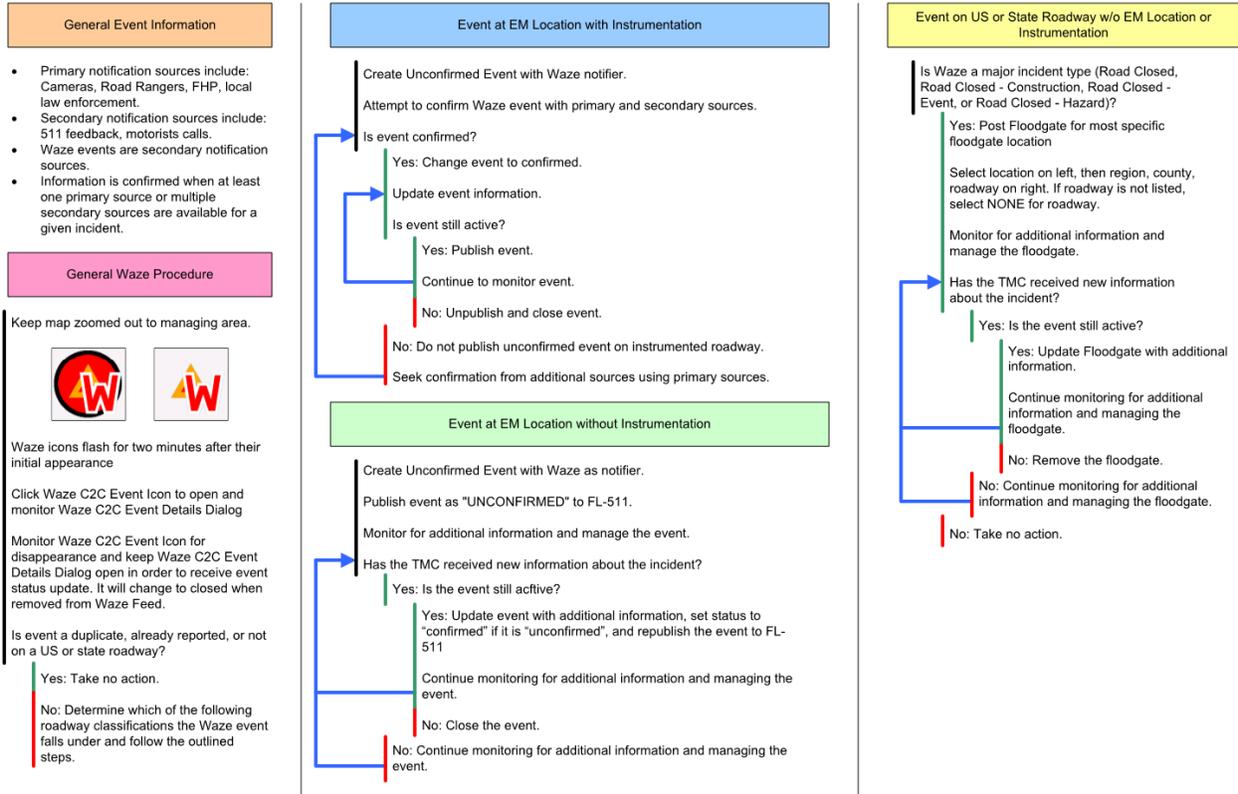
3.5 Waze Incident not at Event Management location

1. If the Waze event type is a major incident type (Road Closed, Road Closed - Construction, Road Closed - Event, or Road Closed - Hazard), continue to step 2. If not, take no further action.
2. Post a Floodgate for the most specific Floodgate location.
3. Select location on left, then region, county, roadway on right. If roadway is not listed, select NONE for roadway.
4. Monitor for additional information and manage the floodgate.

5. If the TMC has received new information about the incident, continue to step 6. If not, go back to step 4.
6. If the event is still active, update the floodgate with additional information and go back to step 4. If not, remove the Floodgate.

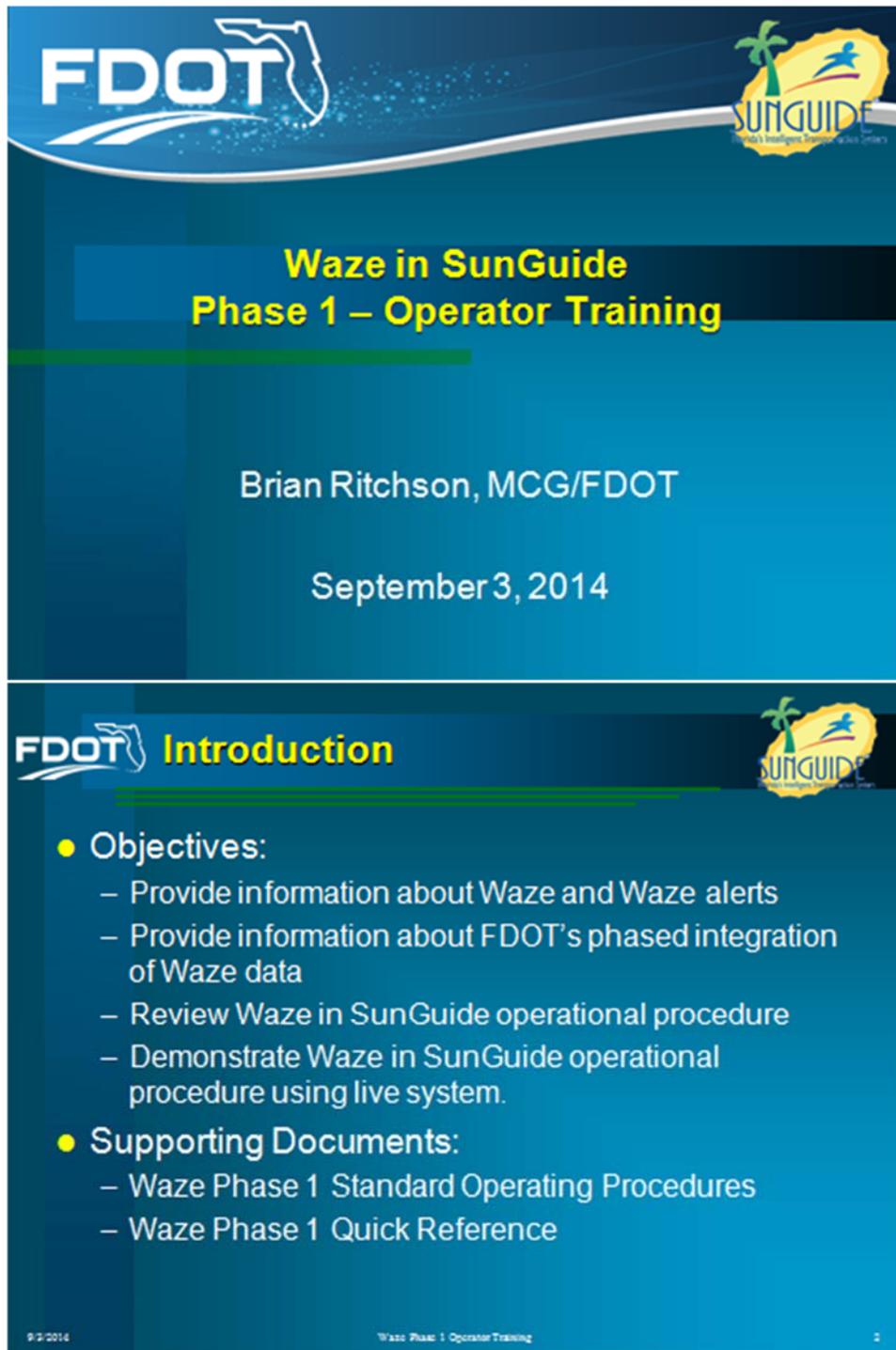
Appendix C

Waze Incident Operations Phase 1 Quick Reference Guide



Appendix D

Waze Phase 1 Operator Training v05



The slide features a blue background with a white wave graphic. In the top left corner is the FDOT logo, and in the top right corner is the SunGuide logo. The main title is centered in yellow text. Below the title, the presenter's name and the date are listed in white text. The bottom section of the slide contains a bulleted list of objectives and supporting documents, also in white text.

FDOT **SUNGUIDE**

Waze in SunGuide Phase 1 – Operator Training

Brian Ritchson, MCG/FDOT

September 3, 2014

FDOT **Introduction** **SUNGUIDE**

- Objectives:
 - Provide information about Waze and Waze alerts
 - Provide information about FDOT's phased integration of Waze data
 - Review Waze in SunGuide operational procedure
 - Demonstrate Waze in SunGuide operational procedure using live system.
- Supporting Documents:
 - Waze Phase 1 Standard Operating Procedures
 - Waze Phase 1 Quick Reference

9/2/2014 Waze Phase 1 Operator Training 2



- Waze incident overview
- Phase 1 and 2 operations
- Waze Phase 1 operations general procedure
 - Waze roadway classification scenarios:
 - Event at EM Location with Instrumentation
 - Event at EM Location without Instrumentation
 - Event on US or State Roadway without EM Location or Instrumentation
- Questions at the end of each live demonstration

9/2/2016 Waze Phase 1 Operator Training 2



- Waze Provides Crowd Source Data
 - Updated every 5-15 minutes
 - Contains traffic alerts similar to SunGuide events/alerts
- Central Office processes Waze Data at TERL
 - Filtered on event type, road type, confidence
 - Each TMC gets events from own region by county

9/2/2016 Waze Phase 1 Operator Training 4

Waze Incident Overview

- District TMCs receive, verify, and publish Waze events
 - Operator creates, verifies, and manages local SunGuide EM event
 - Operator publishes local event to FL-ATIS with Waze attribution

9/2/2016

Waze Phase 1 Operator Training

5

Phase 1 Operations

- Phase 1 Waze Operations uses a rapidly integrated solution using existing components including the center to center infrastructure and remote C2C Events graphical user interface.
- Phase 1 deployment is scheduled for September 12th

9/2/2016

Waze Phase 1 Operator Training

6

FDOT Phase 2 Operations



- Phase 2 will use a more user friendly, semi-automated solution that will take a few months to design, review, and deploy.
- Documentation for Phase 2 operations will follow the Phase 1 roll-out.

9/2/2016

Waze Phase 1 Operator Training

7

FDOT SunGuide Operations – Phase 1 Waze C2C Events



Mouse hover box shows Waze attribution

A red blinking circle surrounds the event for two minutes after it appears on the map.



Waze C2C Events have red 'W' as indicator on icon

9/2/2016

Waze Phase 1 Operator Training

8

FDOT SunGuide Operations – Phase 1 Waze C2C Events

- Waze C2C Event Detail Pop-up when icon is clicked
- Event Status will be “Closed” when Waze Alert is removed from the feed

- Waze incident type
- Leave dialog open when managing event...
- Event Status will change to closed when alert is removed from feed

FDOT SunGuide Operations – Phase 1 Waze C2C Events

- Verify the Waze C2C Event is not a duplicate of an existing event already published
- If it is a duplicate, then take no further action.
- Determine whether or not the roadway the event is on:
 - Is Instrumented
 - Has an EM location
 - Is a US or State roadway
- Handle the event depending on one the following roadway classifications

9/2/2016 Waze Phase 1 Operator Training 10

FDOT SunGuide Operations – Phase 1 Waze C2C Events 

- Instrumented and Covered Roadways (with EM locations configured):
 - Create "UNCONFIRMED" SunGuide event with Waze attribution
 - Use Waze as the Notifying Agency
 - Use Waze Waze as the Notifying Contact

Add New Event

Event Type:	Crash
Notifying Agency:	Waze
Notifying Contact:	Waze Waze
Status:	Unconfirmed

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FDOT SunGuide Operations – Phase 1 Waze C2C Events 

Event # 1931 [-] collapse all [+] expand all

Administrative Details Release Ownership Save

Operator: cpackard
Date/Time Added: 5/14/2013 7:21
Status: Active
Status Last Updated: 5/14/2013 12:30

Contacts
There are currently no contacts.

Impact on Roadways Save

Event Location / Coordinates
Leon on I-10 Eastbound, 10000 ft Al MM 211 No Congestion

Lane Blockage
All Lanes (of 2 Lanes) Blocked

Anticipated Clearance Time: _____ minutes
FL-ATIS Incident Severity: Major

Reporting & Dispatch Save

Organization: TERL TMC
Notifying Agency: Waze
Notifier Contact: Waze Waze

Vehicle(s) Dispatch
There are currently no dispatched vehicles.

Procedural Error
There are currently no errors.

9/2/2014 Waze Phase 1 Operator Training 12

 **SunGuide Operations –
Phase 1 Waze C2C Events** 

- If confirmed, change event status to “Active” and publish the Waze event
- If not confirmed, seek additional event verification before proceeding
- Continue to manage, update, and close event using standard operating procedures

9/2/2016

Waze Phase 1 Operator Training

13

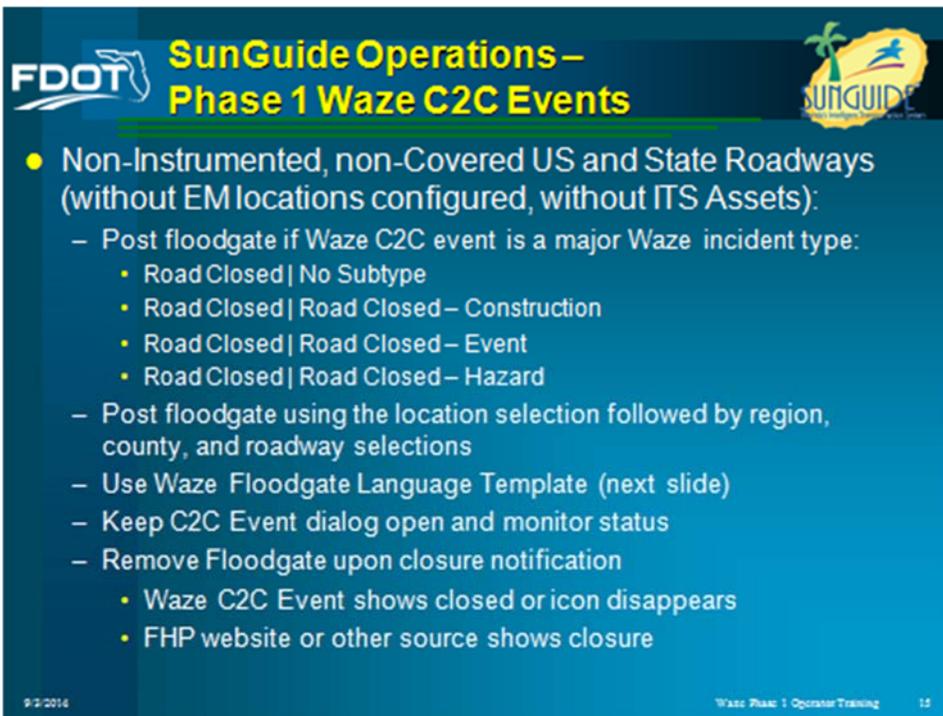
 **SunGuide Operations –
Phase 1 Waze C2C Events** 

- Non-Instrumented but Covered Roadways (with EM locations configured, without ITS Assets):
 - Create “UNCONFIRMED” SunGuide event with Waze attribution
 - Publish as UNCONFIRMED
 - Continuously attempt to confirm Waze event
 - attempting to receive verification from available sources
 - FHP website, law enforcement agencies, 511 feedback, HERE.com, and other sources
 - If event is confirmed, change event from UNCONFIRMED to CONFIRMED
 - Manage the event with available information sources
 - Close event when Waze C2C Event Details Dialog closes event, and/or other indication/verification of normal conditions is available

9/2/2016

Waze Phase 1 Operator Training

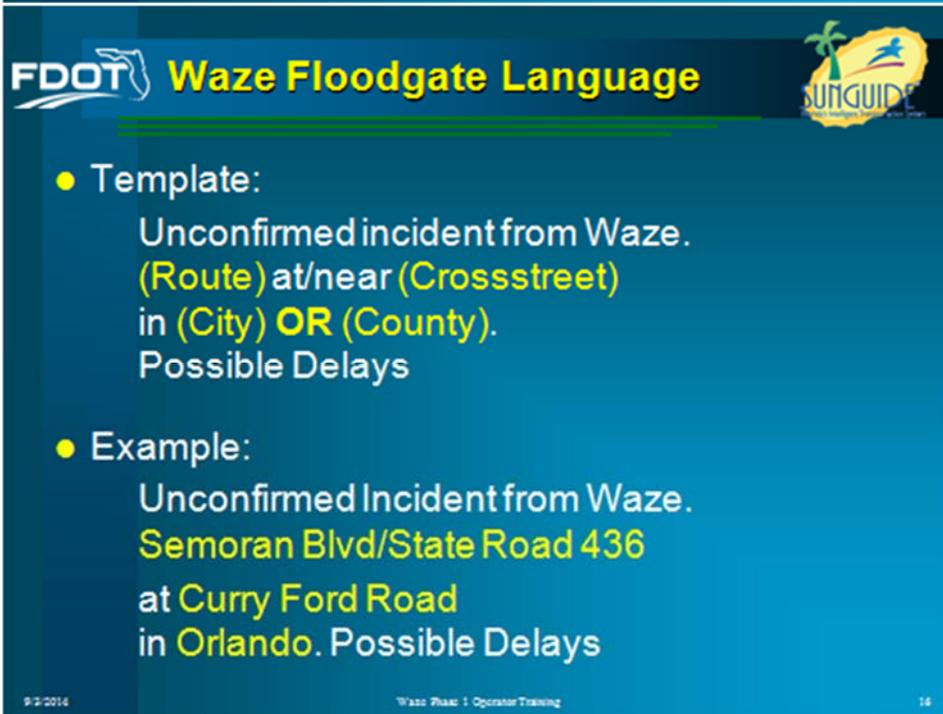
14



FDOT **SunGuide Operations – Phase 1 Waze C2C Events** 

- Non-Instrumented, non-Covered US and State Roadways (without EM locations configured, without ITS Assets):
 - Post floodgate if Waze C2C event is a major Waze incident type:
 - Road Closed | No Subtype
 - Road Closed | Road Closed – Construction
 - Road Closed | Road Closed – Event
 - Road Closed | Road Closed – Hazard
 - Post floodgate using the location selection followed by region, county, and roadway selections
 - Use Waze Floodgate Language Template (next slide)
 - Keep C2C Event dialog open and monitor status
 - Remove Floodgate upon closure notification
 - Waze C2C Event shows closed or icon disappears
 - FHP website or other source shows closure

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FDOT **Waze Floodgate Language** 

- Template:
Unconfirmed incident from Waze.
(Route) at/near **(Crossstreet)**
in **(City)** **OR** **(County)**.
Possible Delays
- Example:
Unconfirmed Incident from Waze.
Semoran Blvd/State Road 436
at **Curry Ford Road**
in **Orlando**. Possible Delays

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