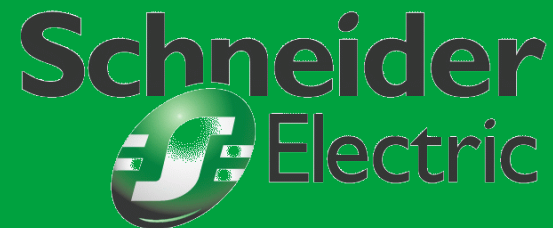


# From Integrated Corridor Management to Integrated Regional Management Dallas Experience

November 20, 2015



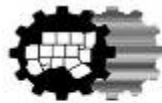
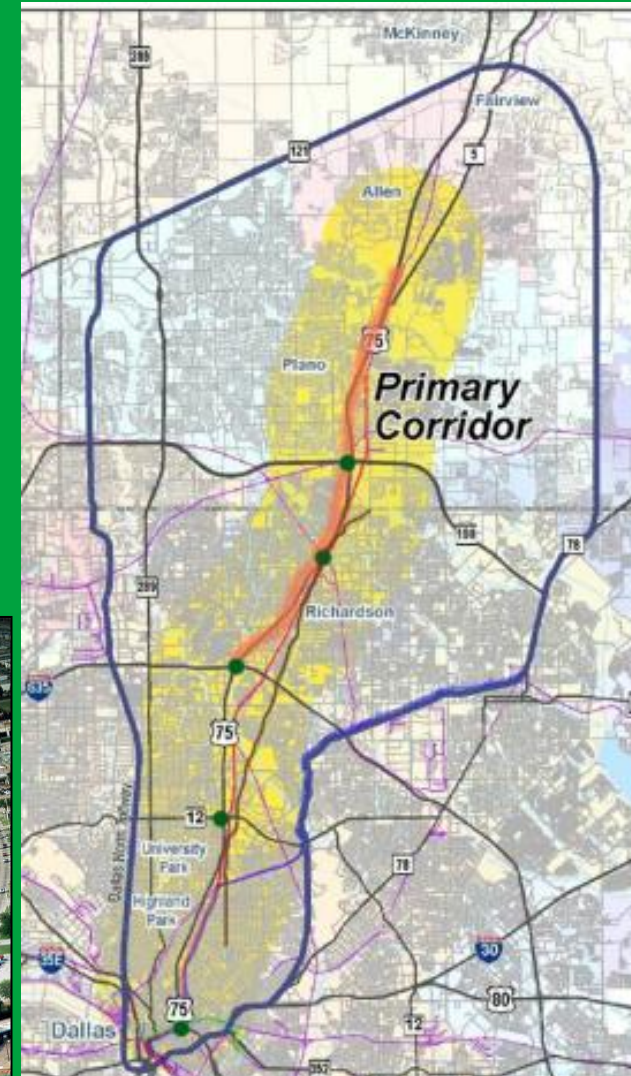
# US DOT ICM Pioneer Sites

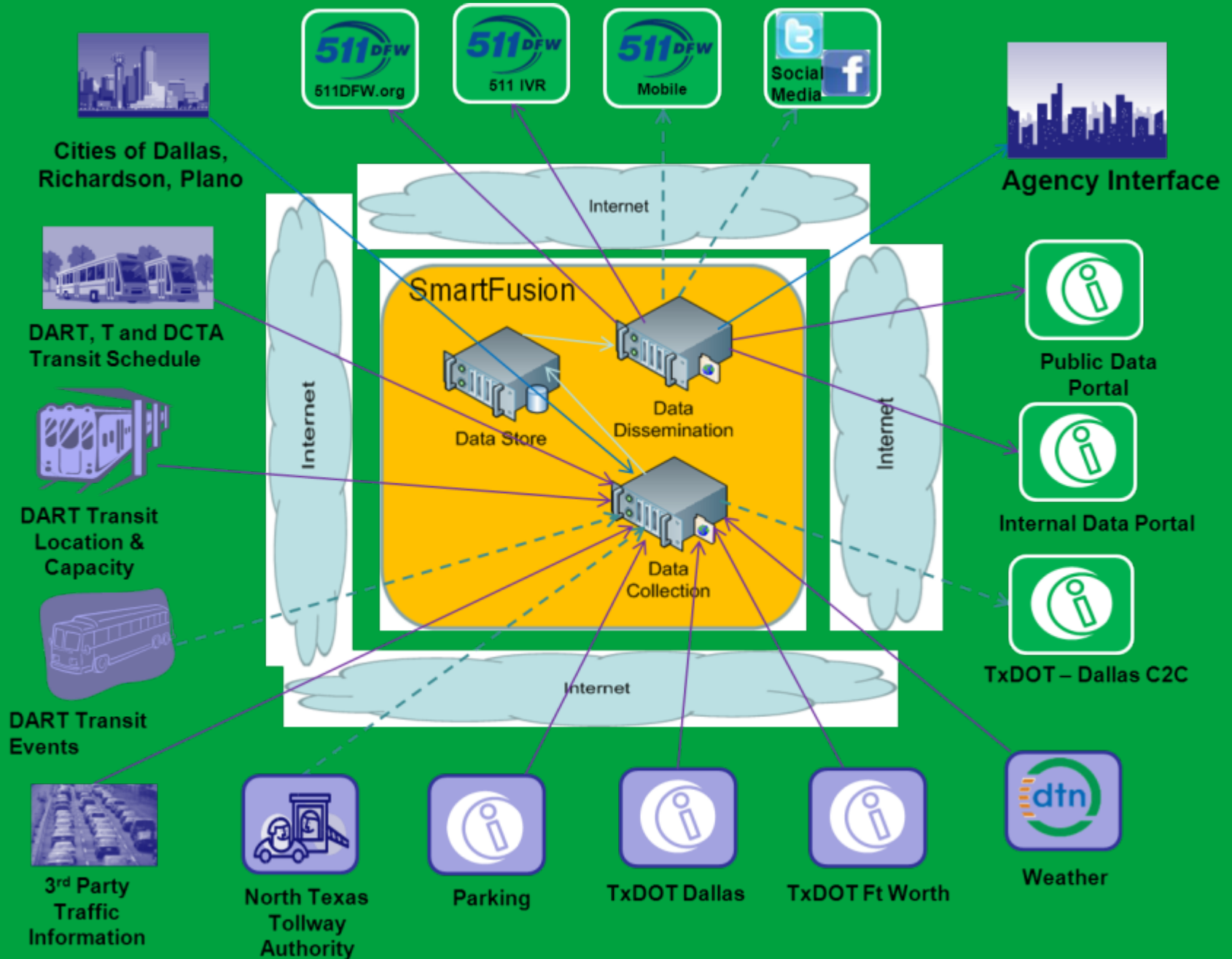


**13 Additional ICM Planning  
Sites Selected Including;  
NYC and Buffalo.**

# US 75 Corridor Networks

- Freeway with continuous Frontage Roads
- Managed HOV lanes
- Dallas North Toll way
- DART Bus and Ligh Rail Network
- Three Cities, 900 Signals, 167 Miles of Arterials
- Multiple TMCs
- Regional ATIS







# Dallas ICMS Architecture- operations

## DSS Sub-System

Expert Rules

Prediction

Evaluation



## SmartNET (EcoTrafIX) Sub-System

DSS Dialogue

SmartNET  
(EcoTrafIX)

ICM  
Coordinator

Agency  
User

Agency  
Administrator



511DFW

Public Web

IVR

Public XML

Trip Planner

Social Media

My511 - Alerts

Mobile Application

## SmartFusion Sub-System

Collection & Fusion platform

C2C

DART  
Events

AVL/APC

DART  
GTFS

Weather

NAVTEQ  
Arterials

Parking  
Manage  
ment

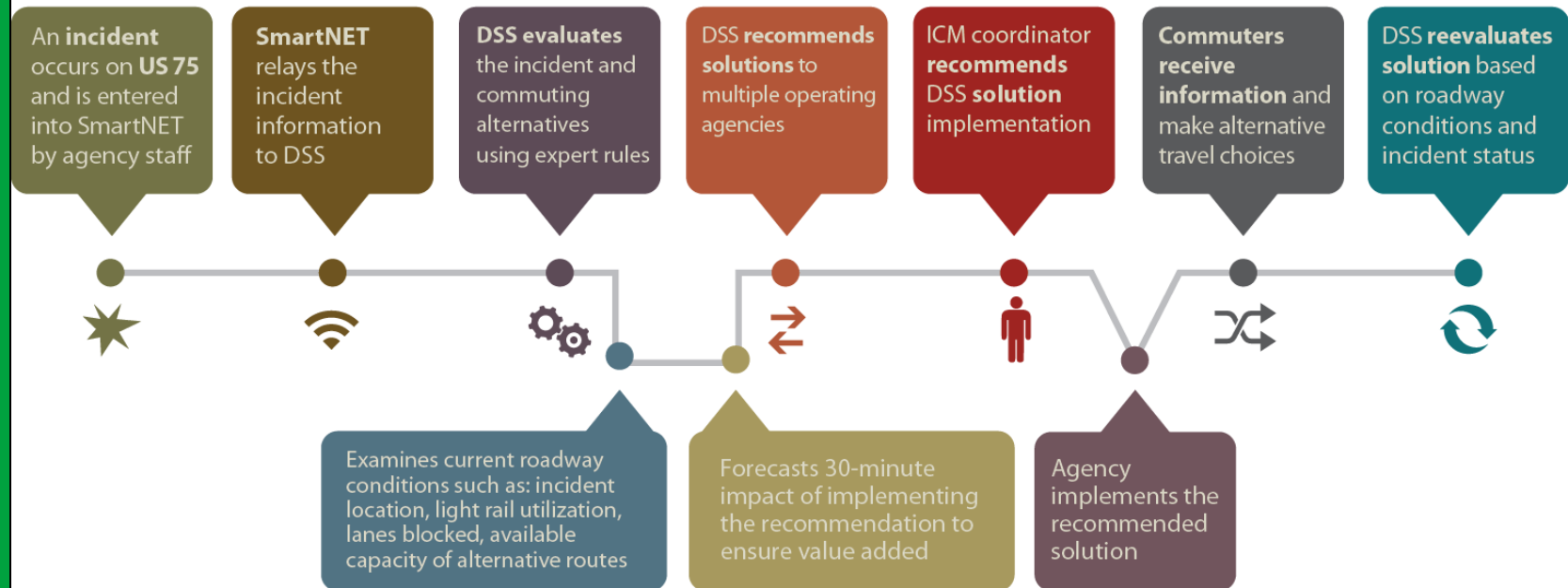
TxDOT  
XML  
(HOV)



# Integrated Corridor Management (ICM) Decision Support System (DSS)

Alternatives for Agencies, Options for Commuters When Incidents Occur on US 75

## THE PROCESS



## THE BENEFITS



**Improved travel time reliability for commuters**



**Enhanced decision making support for operating agencies**



**Achieves a 20:1 return (\$278.8 million) on the project's cost over 10 years**

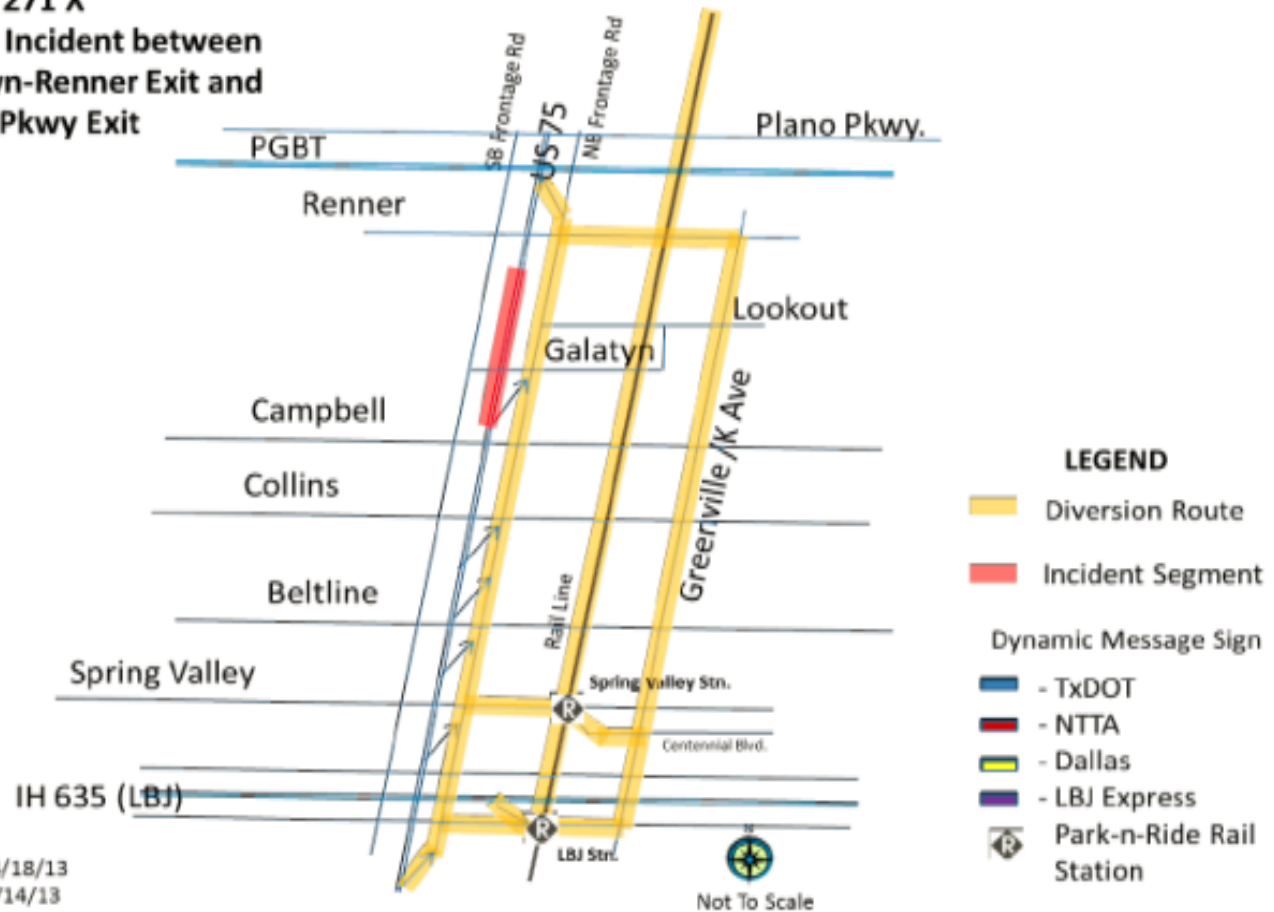


**Less pollution from idling vehicles in congested traffic**

## Response Plan: J75N271 X AM

J 75 N 271 X

Major Incident between  
Galatyn-Renner Exit and  
Plano Pkwy Exit



### Involved Agencies

1. [Richardson](#)
2. [Plano](#)
3. [DART](#)

# Incident Creation

(2015111608082305074) Traffic inci...

Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at Gala...

AFFECTED LANES

QUICK COMMANDS

DESCRIPTION

TxDOT Dallas: Due to accident on US 75 Northbound(TxDOT Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)

OWNED BY

CREATED BY

You (TxDOTAdmin) (TxDOT Dallas) TxDOTAdmin (TxDOT Dallas)

START

END

Today 08:08 AM

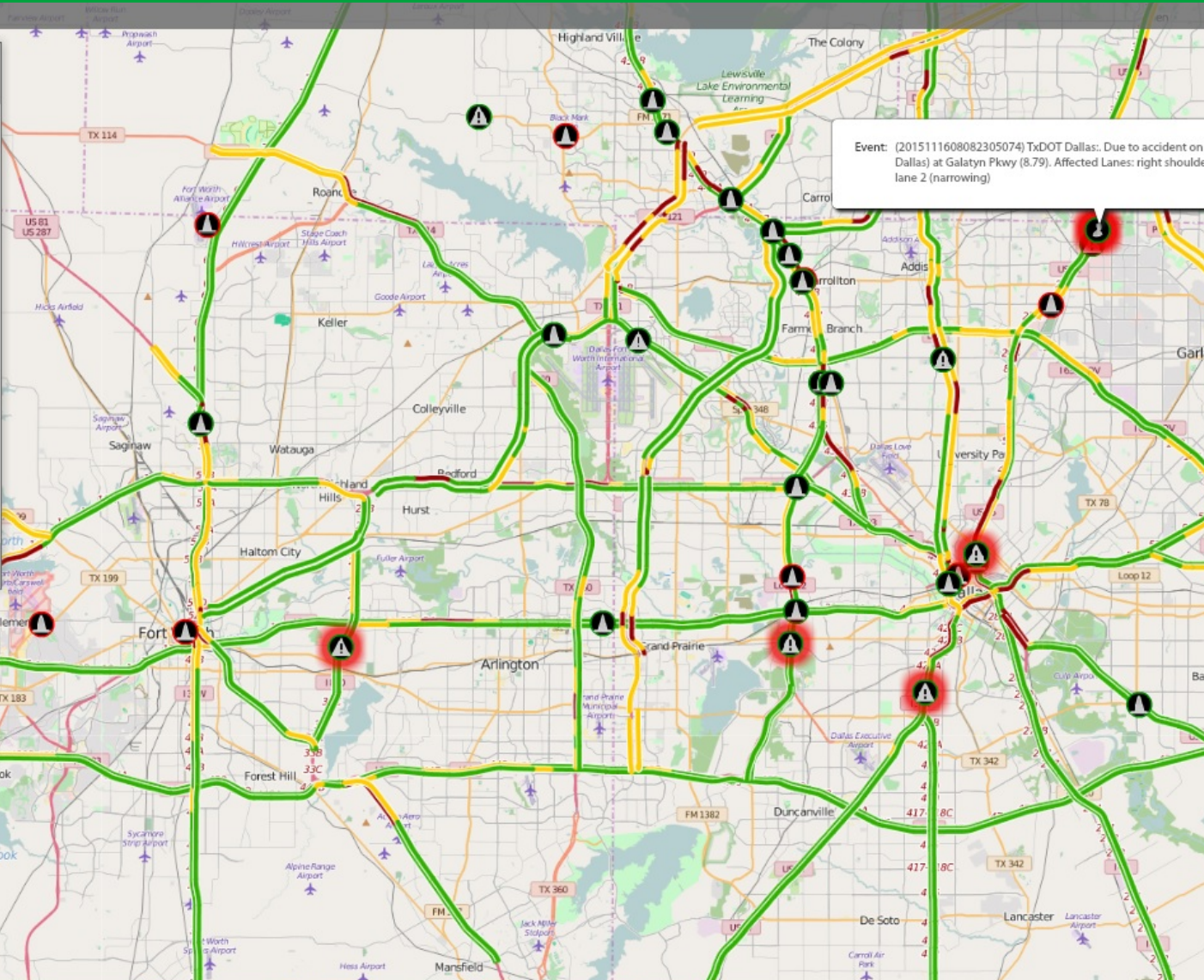
Unknown

Status

Devices/Resources

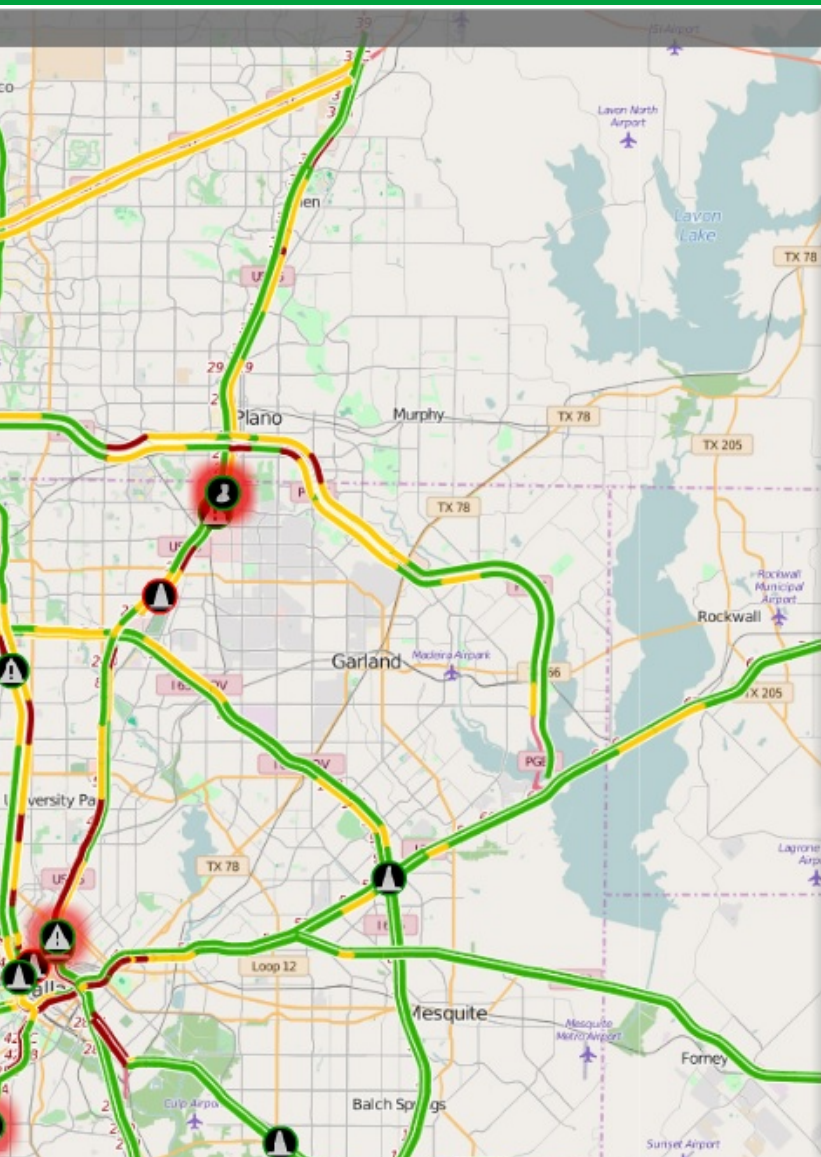
Plans

Event: (2015111608082305074) TxDOT Dallas: Due to accident on Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder lane 2 (narrowing)





# Recommended Plan



**(2015111608082305074) Traffic inci...**  
Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at Gala...

**AFFECTED LANES**

↑ ↑ ↑

**QUICK COMMANDS**

⊕ ⚠ ⚙ 🖨 🔧

**DESCRIPTION**  
TxDOT Dallas: Due to accident on US 75 Northbound(TxDOT Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)

**OWNED BY** **CREATED BY**  
You (TxDOTAdmin) (TxDOT Dallas) TxDOTAdmin (TxDOT Dallas)

**START** **END**  
Today 08:08 AM Unknown

**Status** **Devices/Resources** **Plans**

**J75N271 X (TxDOT Dallas, ICM, PI...**

**Find candidates**

**SYNC** **PLANS**

11/16/15 08:11:12 AM +00:01:44  
**J75N271 X (TXDOT DALLAS, ...** 0/3

**CONFIRM** **CANCEL**

**Plan Implementation**

Plano: Plano: Activate Flex Group 19  
Richardson: Richardson: Activate Flex ...  
DART: DART: Monitor every 15 min.  
TxDOT Dallas: Enable DMS Message#1

**Plan Termination**

ICM: Wait time: 0:00:01



# Agencies Readiness

**(2015111608082305074) Traffic inci...**  
Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at Gala...

**AFFECTED LANES**

Diagram showing 4 lanes. Lane 1 (leftmost) is closed (grey). Lane 2 is narrowing (yellow). Lane 3 is closed (red). Lane 4 (rightmost) is closed (red).

**QUICK COMMANDS**

Icons: Map, Incident, Person, Car, Pencil

**DESCRIPTION**

TxDOT Dallas: Due to accident on US 75 Northbound(TxDOT Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)

**OWNED BY** You (TxDOTAdmin) (TxDOT Dallas) **CREATED BY** TxDOTAdmin (TxDOT Dallas)

**START** Today 08:08 AM **END** Unknown

**Plan Implementation**

- Plano: Plano: Activate Flex Group 19
- Richardson: Richardson: Activate Flex ...
- DART: DART: Monitor every 15 min.
- TxDOT Dallas: Enable DMS Message#1

**Plan Termination**

- ICM: Wait time: 0:00:01

# TxDOT Response

**(2015111608082305074) Traffic inci...**  
Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at Gala...

**AFFECTED LANES**

↑ ↑ ↑

**QUICK COMMANDS**

**DESCRIPTION**  
TxDOT Dallas: Due to accident on US 75 Northbound(TxDOT Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)

**OWNED BY** You (TxDOTAdmin) (TxDOT Dallas) **CREATED BY** TxDOTAdmin (TxDOT Dallas)

**START** Today 08:08 AM **END** Unknown

**Status** **Devices/Resources** **Plans**

**Plan Implementation**

Plan	Status
Plano: Plano: Activate Flex Group 19	+00:08:01
Richardson: Richardson: Activate Flex ...	+00:08:01
DART: DART: Monitor every 15 min.	+00:08:01
TxDOT Dallas: Enable DMS Message#1	YES NO

**Plan Termination**

ICM: Wait time: 0:00:01



# Response Plan in Motion

The interface displays a map of the Dallas-Fort Worth area with a traffic incident highlighted. The incident details are as follows:

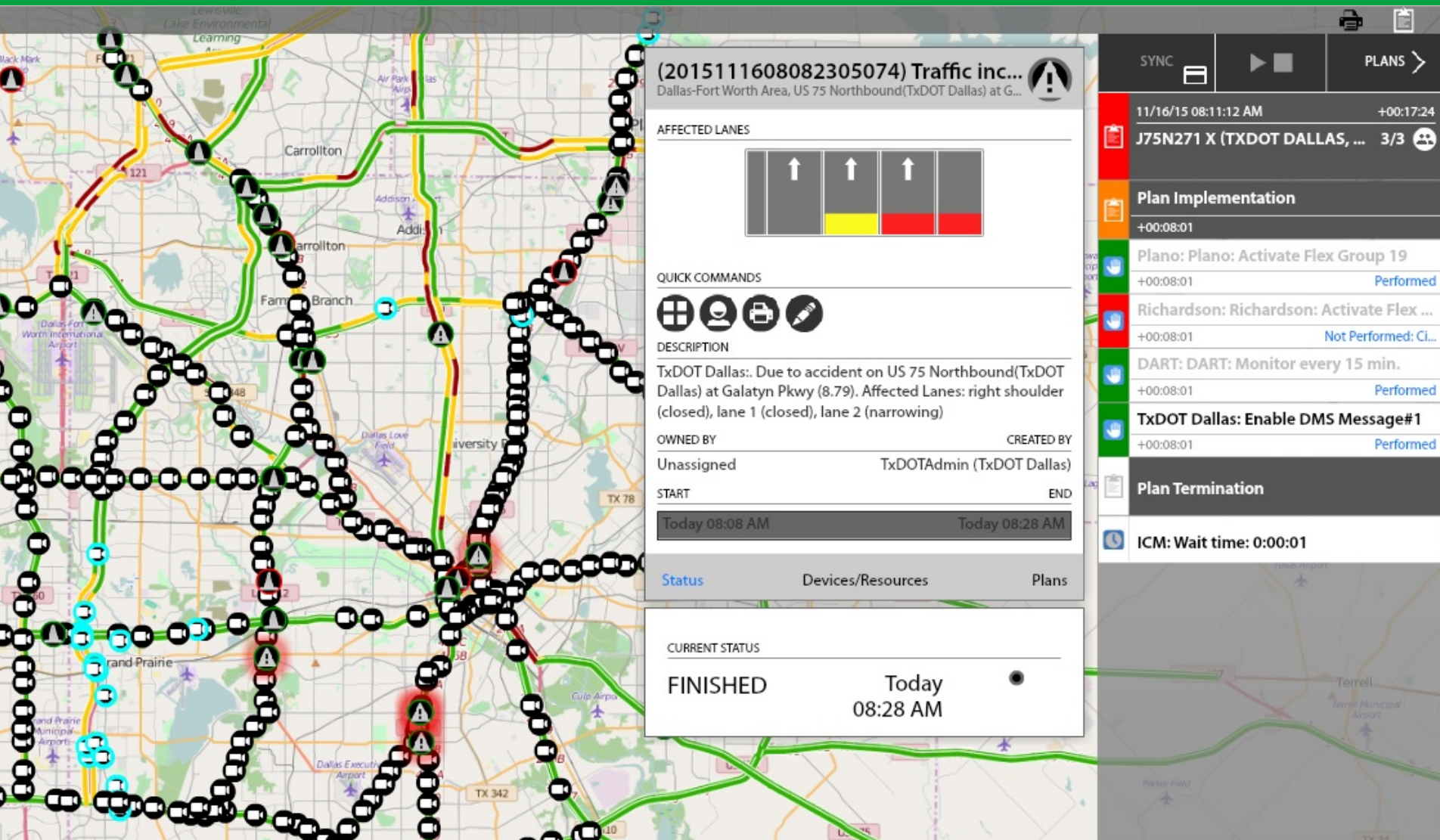
- Incident ID:** (2015111608082305074) Traffic inci...
- Location:** Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at Gala...
- AFFECTED LANES:** A diagram showing four lanes. The rightmost lane is closed (red), the next lane is narrowed (yellow), and the other two lanes are open (grey with white arrows).
- QUICK COMMANDS:** A row of five icons: a grid, a skull and crossbones, a person, a printer, and a pencil.
- DESCRIPTION:** TxDOT Dallas: Due to accident on US 75 Northbound(TxDOT Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)
- OWNED BY:** You (TxDOTAdmin) (TxDOT Dallas)
- CREATED BY:** TxDOTAdmin (TxDOT Dallas)
- START:** Today 08:08 AM
- END:** Unknown

At the bottom, there are three tabs: **Status**, **Devices/Resources**, and **Plans**.

The **Plans** tab is active, showing a timeline of events:

- SYNC** (icon)
- PLANS** (icon)
- 11/16/15 08:11:12 AM** +00:16:53
- J75N271 X (TXDOT DALLAS, ... 3/3** (icon)
- RUNNING**
- Plan Implementation**
- +00:08:01**
- Plano: Plano: Activate Flex Group 19** +00:08:01 **Performed**
- Richardson: Richardson: Activate Flex ...** +00:08:01 **Not Performed: Ci...**
- DART: DART: Monitor every 15 min.** +00:08:01 **Performed**
- TxDOT Dallas: Enable DMS Message#1** +00:08:01 **Performed**
- Plan Termination**
- Waiting for Event**
- ICM: Wait time: 0:00:01**

# Incident Closed, Plan Terminated



**(2015111608082305074) Traffic inc...**  
Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at G...

**AFFECTED LANES**

↑ ↑ ↑

**QUICK COMMANDS**

**DESCRIPTION**  
TxDOT Dallas: Due to accident on US 75 Northbound(TxDOT Dallas) at Galatyn Pkwy (8.79). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)

**OWNED BY**  
Unassigned

**CREATED BY**  
TxDOTAdmin (TxDOT Dallas)

**START**  
Today 08:08 AM

**END**  
Today 08:28 AM

**STATUS** **Devices/Resources** **Plans**

**CURRENT STATUS**  
**FINISHED** Today 08:28 AM

**Plan Implementation**  
+00:08:01

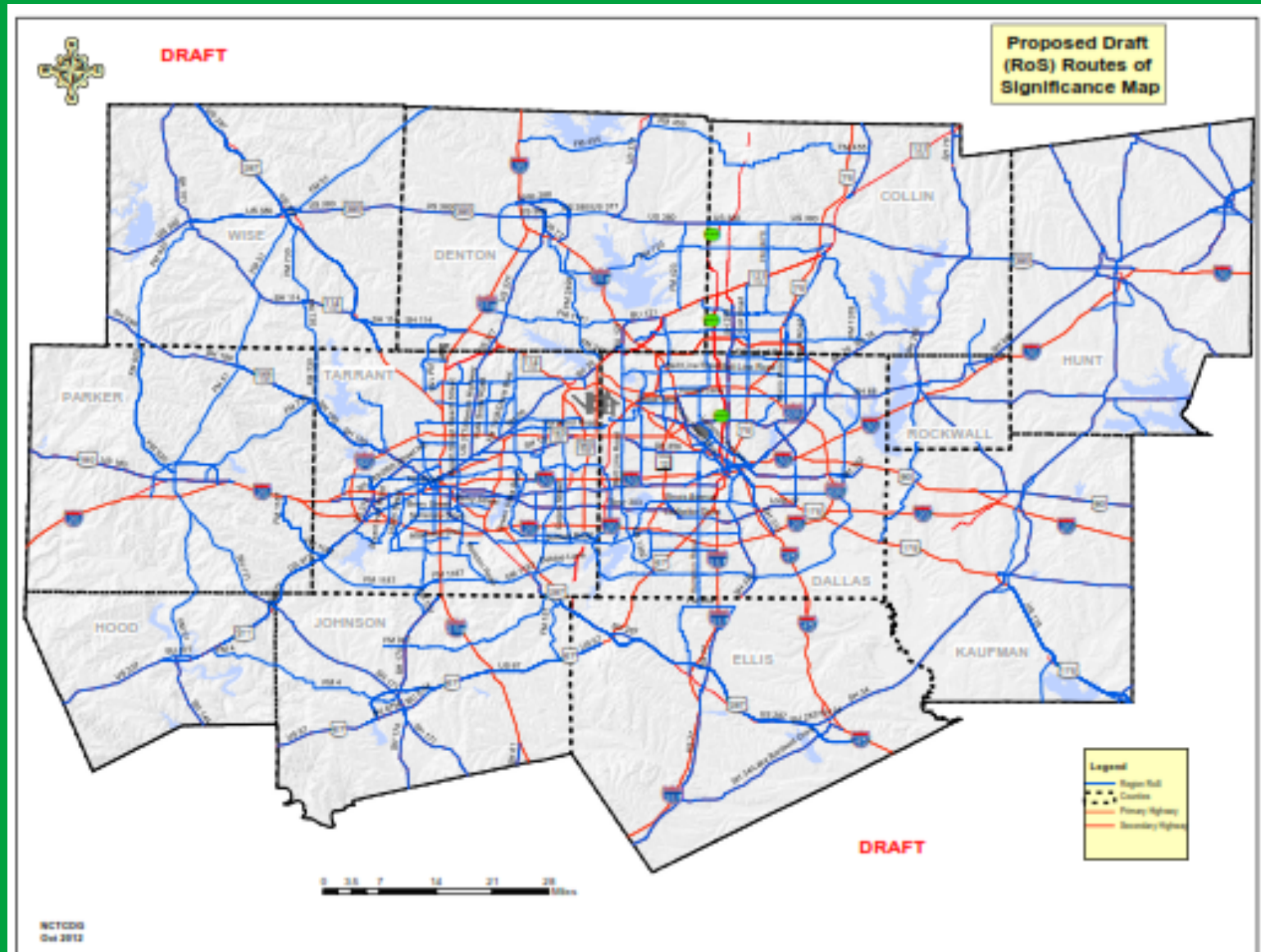
**Plan Termination**  
ICM: Wait time: 0:00:01

# Operational Needs

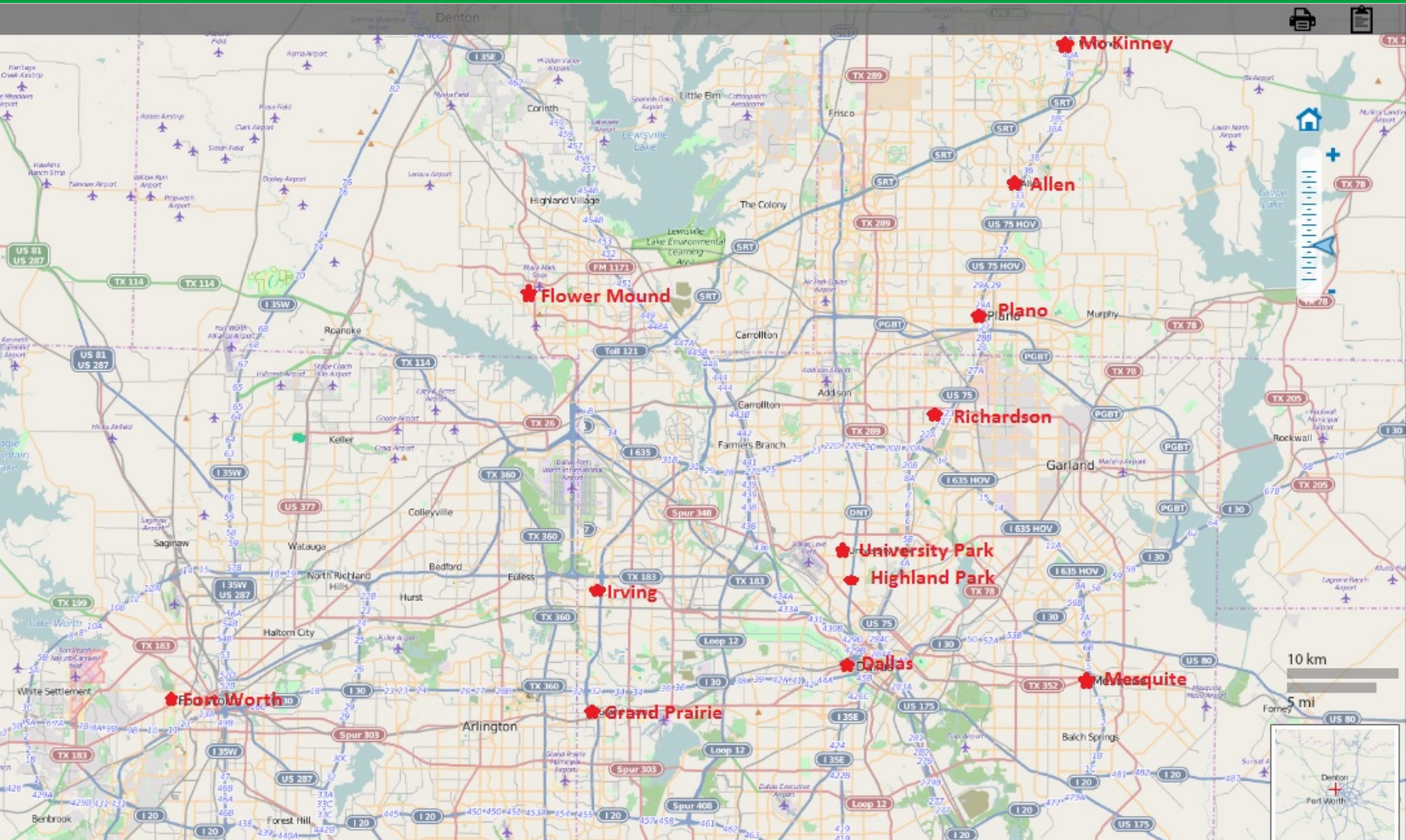
- Regional Expansion
- Resources and Responsibilities Sharing
- Sharing of ICM Coordinator Responsibility
- Improved User Interface
- Map Centric
- Situation Awareness
- ATMS and DSS Automation
- Transit Applications
- Dynamic Performance Measures



# NCTCOG Coverage Area




# DFW Metroplex





# Improved Event Management



BARCELONA/AEROPUE...  
25 °C  
56 422 206 / 253  
sysadmin (ICM)  
09/15/15 12:45 PM  
Logout

Map x Event 5416 x

» Traffic event creation

Traffic incident: 5416 - Draft

Accept Cancel

Main info User act... Contacts Devices Resourc... Action ... Docum... People L... Vehicle...

Where?

Admin. division: Dallas-Fort Worth Area

Road: INTERNATIONAL PKY S

just after S Airfield Dr (8000.0)

Location detail:

When?

From: 09/15/15 12:41 PM

Until: MM/DD/YY hh:mm AM

Duration: days hrs. min.

Impact

Impact: Major

Both directions:

Use right click to set affection on lanes or shoulders

SCENARIOS

NEW

DFW Airport

Dallas View

Dallas CBD UTC

Dallas Love Field

Streaming CCTV on US75

US 75 ICM

LAYERS

Traffic

Events

Signaling Gantries

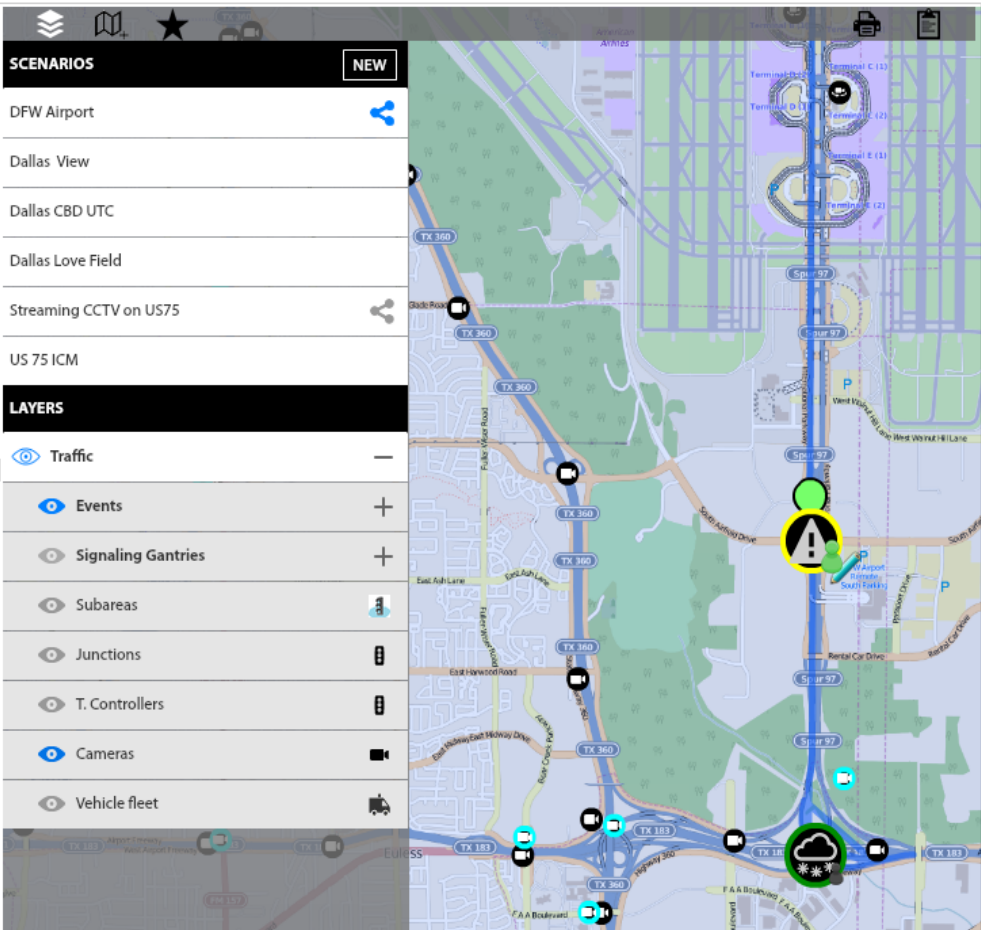
Subareas

Junctions


T. Controllers




Cameras


Vehicle fleet





# Event Ownership / Transfer





 59  0  0 / 25

TxDOTAdmin (TxDOT Dallas)  
09/06/15 04:37 PM  Logout

Map 

**(2015090311103005074) Traffic inc...**  
Dallas-Fort Worth Area, SH 114 Eastbound(TxDOT Dallas) at SH...

**AFFECTED LANES**  


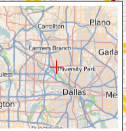


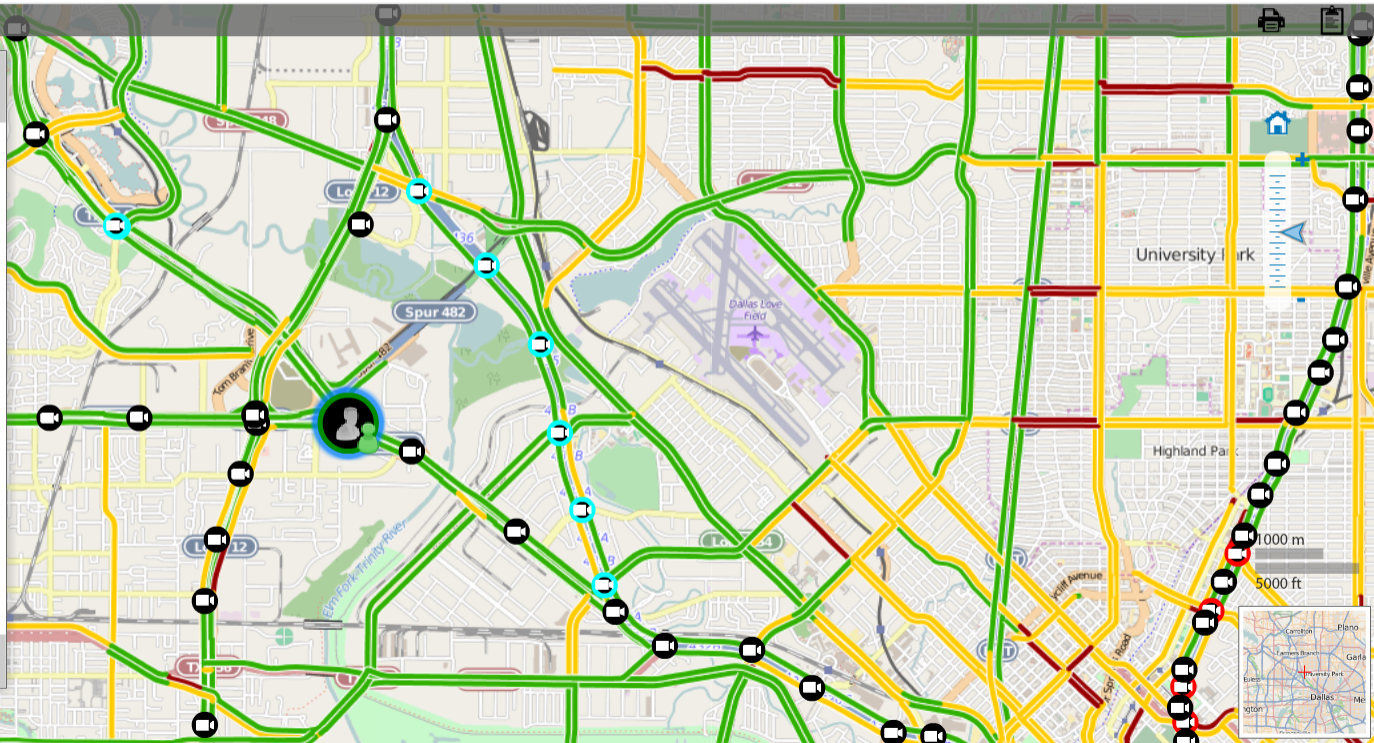
**QUICK COMMANDS**  


**DESCRIPTION** **TRANSFER OWNERSHIP**  
TxDOT Dallas: Due to accident on SH 114 Eastbound(TxDOT Dallas) at SH 183(eastbound). Affected Lanes: right shoulder (narrowing), lane 1 (closed)

**OWNED BY** You (TxDOTAdmin) (TxDOT Dallas) **CREATED BY** sysadmin (TxDOT Dallas)

**START** 09/03/15 11:09 AM **END** Unknown

**Status** **Devices/Resources** **Plans**



# ICM Coordinator Flexibility

59 0 0 / 25 TxDOTAdmin (TxDOT Dallas) 09/06/15 05:33 PM Logout

Show only active

Name	Organization	Active	Profiles
Comanager	Richardson	Yes	Richardson: Organization administrator
CORUser	Richardson	Yes	Richardson: ICM User, Operator
Craig Burgan	TxDOT Dallas	Yes	TxDOT Dallas: Operator
Curtis Jarecki	TxDOT Dallas	Yes	TxDOT Dallas: Operator
DallasAdmin	Dallas	Yes	Dallas: ICM User, Operator, Organization administrator
DallasUser	Dallas	Yes	Dallas: ICM User, Operator / TxDOT Dallas: Operator
DalTrans Admin	DalTrans	Yes	DalTrans: Manager
DalTransUser	DalTrans	Yes	DalTrans: Operator
Dan Loving	DART	Yes	DART: Operator
DARTAdmin	DART	Yes	DART: ICM Coordinator, Organization administrator
DARTAdmin1	DART	Yes	DART: Operator, Organization administrator
DARTUser	DART	Yes	DART: ICM User, Operator

Filter by profile

- ☐ ATMS Dispatcher (1)
- ☐ ATMS System Administrator (2)
- ☐ ATMS Traffic Operator (1)
- ☐ Basic user (6)
- ☐ Basic User (Demo) (0)
- ☐ C2C\_DI\_Profile (19)
- ☐ EventsManagement (14)
- ☐ Head of hall (1)
- ☒ ICM Coordinator (11)
- ☐ ICM System Administrator (10)
- ☐ ICM System Administrator Level (1)

Apply Cancel

Create new user View user & profiles Edit user Deactivate user Activate user User settings Exit



# Situation Awareness

0

0

17

sysadmin (TxDOT Dallas)  
09/19/14 03:34 PM

Logout

Map

Events

Event 256928

SCENARIOS

NEW

Dallas downtown signals

Pelco Camera

US75 @ Richardson

test

traffic signals

LAYERS

Main

Base Map

City Map

Radar Overlay

Traffic

Events

DMS

Measurements...

Incident Detect...

TSS

Cameras

Traffic Control...

Regions

Vehicle fleet

Traffic Speeds

(256928) Traffic incident

Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) in R...

AFFECTED LANES

↑

↑

↑

QUICK COMMANDS

DESCRIPTION

Traffic - Traffic incident: Due to accident At Dallas-Fort Worth Area, US 75 Northbound(TxDOT Dallas) at Ramp to Woodall Rodgers Fwy (1.9). Affected Lanes: right shoulder (closed), lane 1 (closed), lane 2 (narrowing)

OWNED BY

CREATED BY

You (sysadmin) (TxDOT Dallas)

sysadmin (TxDOT Dallas)

START

END

Today 03:31 PM

Unknown


Status





Devices


Plans


Type	Status	Name
		US75 @ Hall
		Spur 366 @ Pearl WB
		Spur 366 @ US75 West
		Spur 366 @ US75 South
		Spur 366 @ US75 North


# Device Control


**EcoTrafic**  
Expert


BARCELONA/AEROPUE...25 °C  |  56  412  212 / 253


sysadmin (ICM)  
09/15/15 12:34 PM  Logout


Map 


 Main


 Traffic


 Events


 Signaling Gantries


 Traffic status


 Measurementsite


 Measurement sites


 Subareas


 Junctions


 T. Controllers


 Traffic Controllers


 Sections


 Arterials


 Incident Detectors

 TSS

 Cameras


 Vehicle fleet

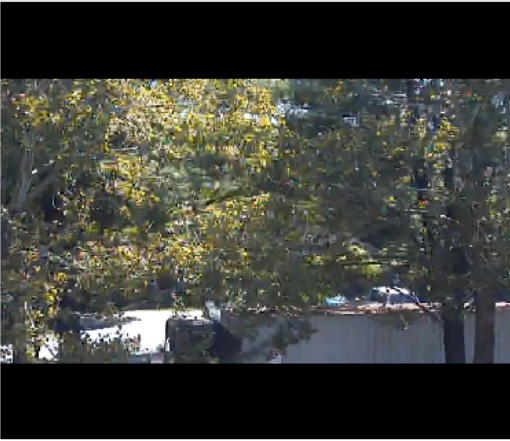
 Thermometers

 POI






Conf Camera - D5118

Conf Camera

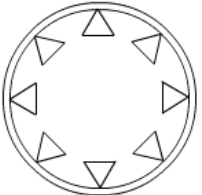




QUICK COMMANDS



Status Movement Presets Commands



+

-

N/A %

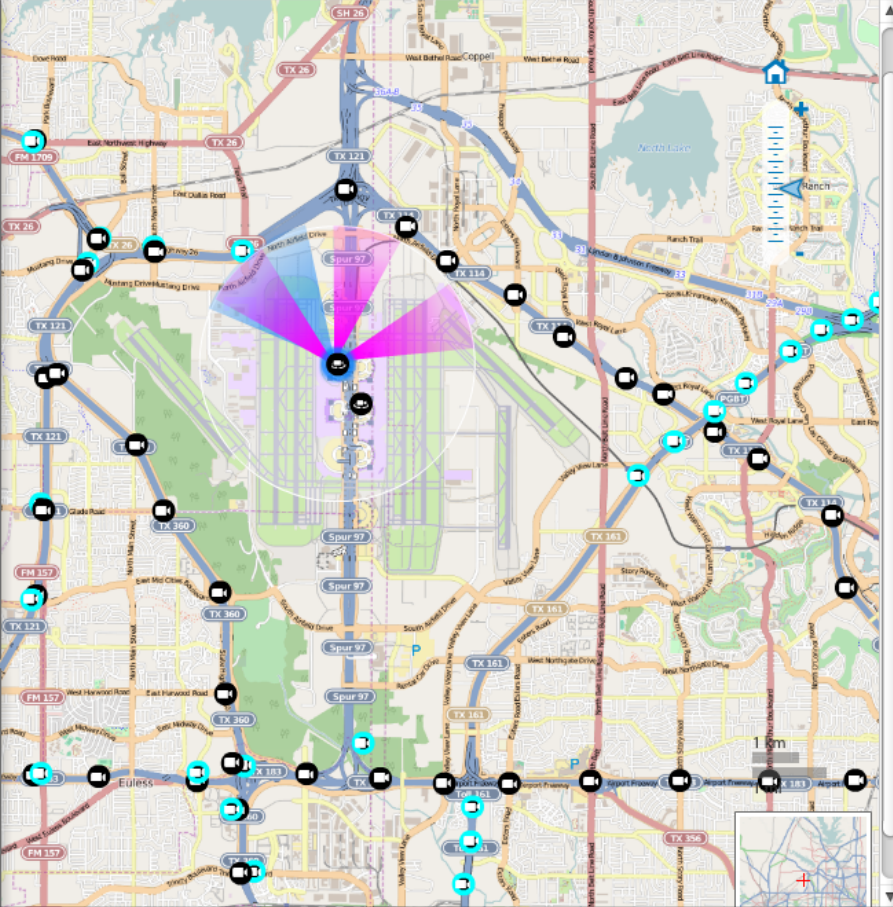
ZOOM

+

-

34 %

SPEED



# DART INCIDENT MANAGEMENT SYSTEMS

INCIDENT LOGGED	OCC LOG	Incident is Logged in	1
RAIL MOVEMENT MONITORED	SCADA	Supervisory Control and Data Acquisition	2
	VBS	Vehicle Business Systems	3
STAFF/PUBLIC INFORMED	EVERBRIDGE	DART Staff informed regarding Incident	4
	PUBLISHER	Public informed via Facebook/Twitter/ DART.org etc	5
	Platform PA System	Public Announcements on Platforms	6
	Platform PAVMB	Messages on Platform Visual Message Boards	7
	Rail PA System	Onboard announcement by Rail Operator	8
EVENT OBSERVATION	Platform CCTV	Activity on the Platforms	9
	Weather DTN	Monitoring Weather	10
RESPONSE	TRANSIT MASTER	Monitor Bus Location & Request for Bus Bridge	11
	TRAPEZE	Establish Bus Bridge by Station Office	12
COORDINATION	?????	?????	
OTHER TECHNOLOGY	TVMs	INFOTAINMENT	HEAD SIGNS
	WHERE IS MY BUS?	APCs	FAREBOXES
	WHERE IS MY TRAIN?	SMART DRIVE	TRANSIT CAMERAS



# DART Supervisory System

## External Sources

- **Transit Master**  
Bus/Rail - AVL/CAD
- **Vehicle Load**  
APC Data Feed
- **Weather**  
Data Feed
- **Surveillance Cameras**  
DART (Police, Safety, Rail Platform, Transit Centers, Operations / Maintenance Facilities, Revenue, etc)  
NTTA, TXDOT
- **GIS Data Layers**

## MAP CENTRIC

1

- Where is my Bus?
- Where is my Train?
- What is the load on the train?
- How is the weather? Past 30 mins, Projected 30 mins
- What is going on the platform?
- Are there any stranded passengers?
- How heavy is the traffic?
- How heavy is the snow falling?
- Are the streets clear?
- Has the accident been cleared?

## Input Form(s):

2

- Incidents Details
- Alerts
- Public Input
- Employee Input

## Report Generator:

3

- Post Incident Summaries
- Incident Queries by Date / Incident Type/Class, etc.
- Automated Periodic reports
- (OCC Logs/Business)

**Core Intelligence: TTA optimized modeling engine against Data Repository (Historical, Real-Time, Projected)**

## Public Facing

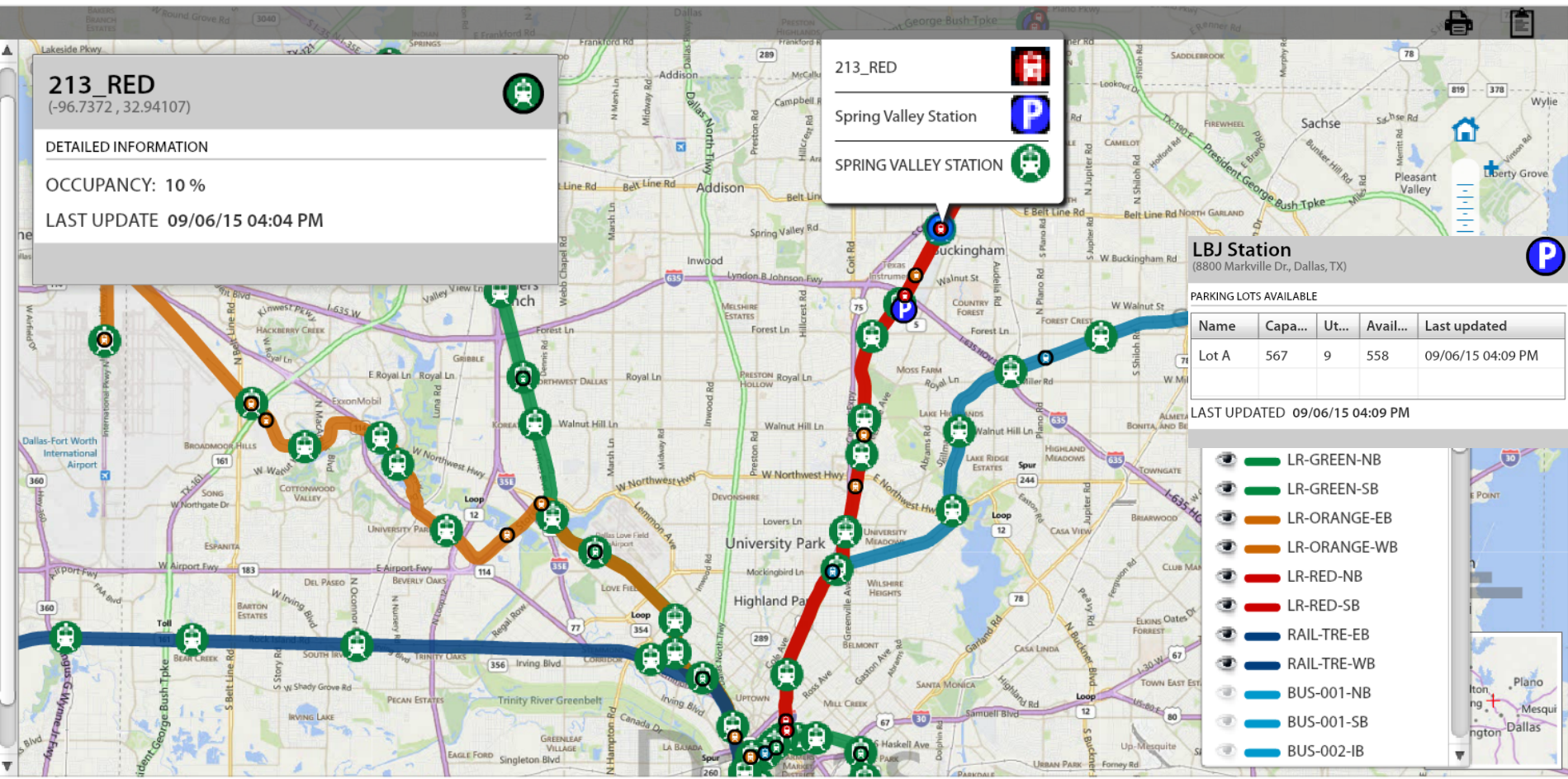
- Everbridge
- Publisher
- DARTNet
- PAVMBs

## Controlled Views/Access

- Public
- DART User
- Power Viewer
- Administrator

**Web Enabled App: Platforms/OS: Laptop – Tablet – Smartphone**

# Real Time Transit Information





# Incident Response Plan #1: LRT RAIL DISRUPTION SHUTTLE LOVERS LANE STATION & MOCKINGBIRD STATION

***Instruction: Initiate Bus Bridge to transport passengers between Lover's Lane Station and Mockingbird Station.***

**ROUTING TO MOCKINGBIRD STATION (Use Destination Code 04) FROM LOVERS LANE STATION**

**L. MILTON TO EXIT LOVERS LANE STATION**

**R. GREENVILLE**

**R. YALE**

**L. WORCOLA**

**R. INTO MOCKINGBIRD STATION**

**ROUTING TO LOVERS LANE STATION (Use Destination Code 06) FROM MOCKINGBIRD STATION**

**L. OUTER ROAD TO EXIT MOCKINGBIRD STATION**

**L. TWIN SIXTIES**

**R. US 75 FRONTAGE ROAD**

**R. LOVERS LANE**

**R. GREENVILLE**

**R. INTO LOVERS LANE STATION**

**Use bus requirements and supervisory staff for Bus Bridge**

**Step #1:** Announce Change in Operation to Train operators and trains supervisors.

**Step #2:** Notify Bus Control to Set up Bus Bridge #1 between Lovers Lane Station and Mockingbird at 9:00 am.

**Step #3:** Order 10 buses including 5 at Mockingbird and 5 at Lovers


**Step 4:** Request DART Police, F

**Step 5:** Notify DART PIO to

Time Period	Pass/Hr	Bus Require.	Supervisors Required at each sation.	Police or fare enforcement
Before 6:00 am	600/hr	8 buses	2	2
6:00 am to 9:00 am	1600/hr	20 buses	2	2
9:00 am until 3:00 pm	600	10 buses	2	2
3:00 pm until 7:00 pm	1600	20 buses	2	2
After 7:00 pm	600	8 buses	2	2






# LRT Rail Disruption Shuttle

US75 @ Mockingbird  
US75 @ Mockingbird



03:28:39 PM

QUICK COMMANDS







Status Movement Presets Commands

US 75@Mockingbird SB  
(-96.77866767871454, 32.8367491736944)

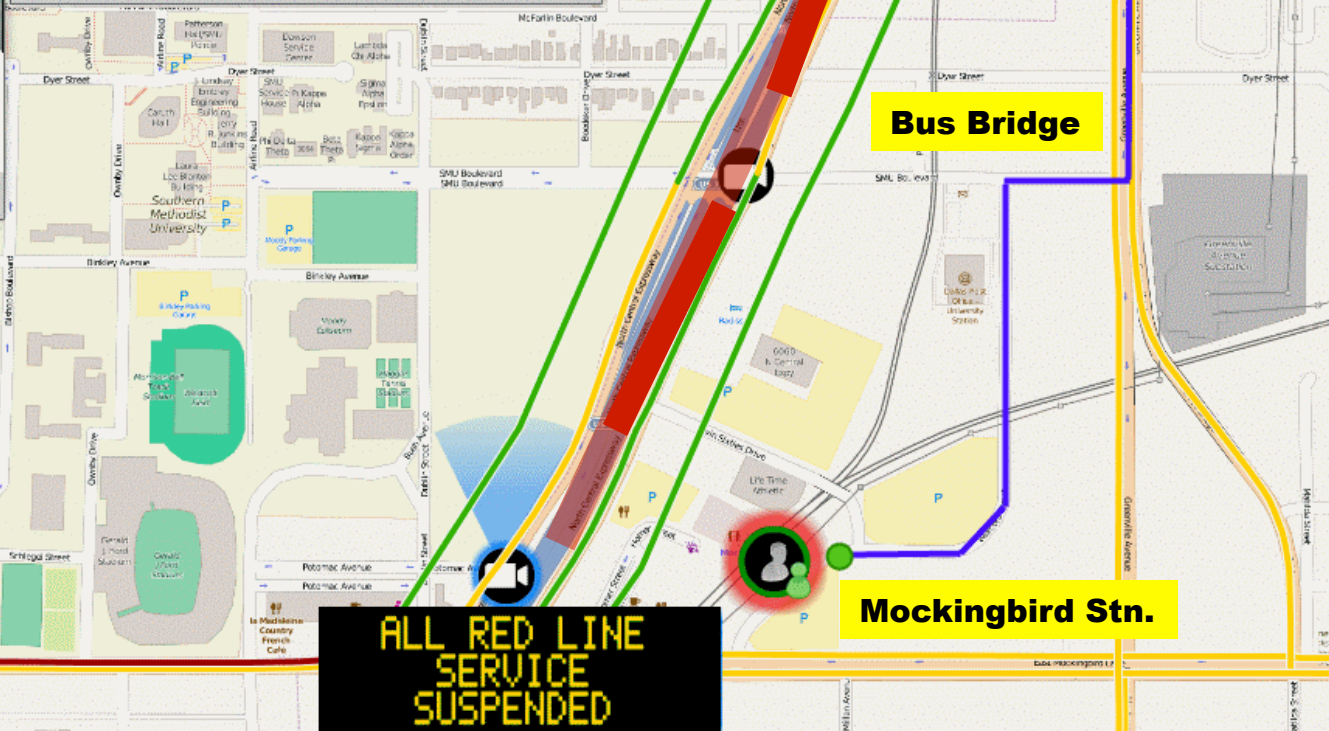
SIGN ON STREET

ALL RED LINE  
SERVICE  
SUSPENDED

QUICK COMMANDS



Status Edit New Stack Commands



Lovers Ln. Stn.

Bus Bridge

Mockingbird Stn.

ALL RED LINE  
SERVICE  
SUSPENDED



# Bus Bridge Response Plan

0
 1
 0 / 0

DARTAdmin (DART)  
09/05/15 12:52 AM  Logout

Map x Events x Event 196966 x

### (196966) Transit incident

(LR-RED-SB) DART LIGHT RAIL RED LINE SOUTHBOUND(null -> ...)

**QUICK COMMANDS**

---

**DESCRIPTION**

DART: Due to building collapse on LR-RED-SB (DART LIGHT RAIL RED LINE SOUTHBOUND) - LR-RED-SB LOVERS LANE STATION -> MOCKINGBIRD STATION

<b>OWNED BY</b>	<b>CREATED BY</b>
You (DARTAdmin) (DART)	DARTAdmin (DART)
<b>START</b>	<b>END</b>
Today 12:50 AM	Unknown

Status
Devices/Resources
Plans

Event: (196966) DART: Due to building collapse on LR-RED-SB (DART LIGHT RAIL RED LINE SOUTHBOUND) - LR-RED-SB LOVERS LANE STATION -> MOCKINGBIRD STATION

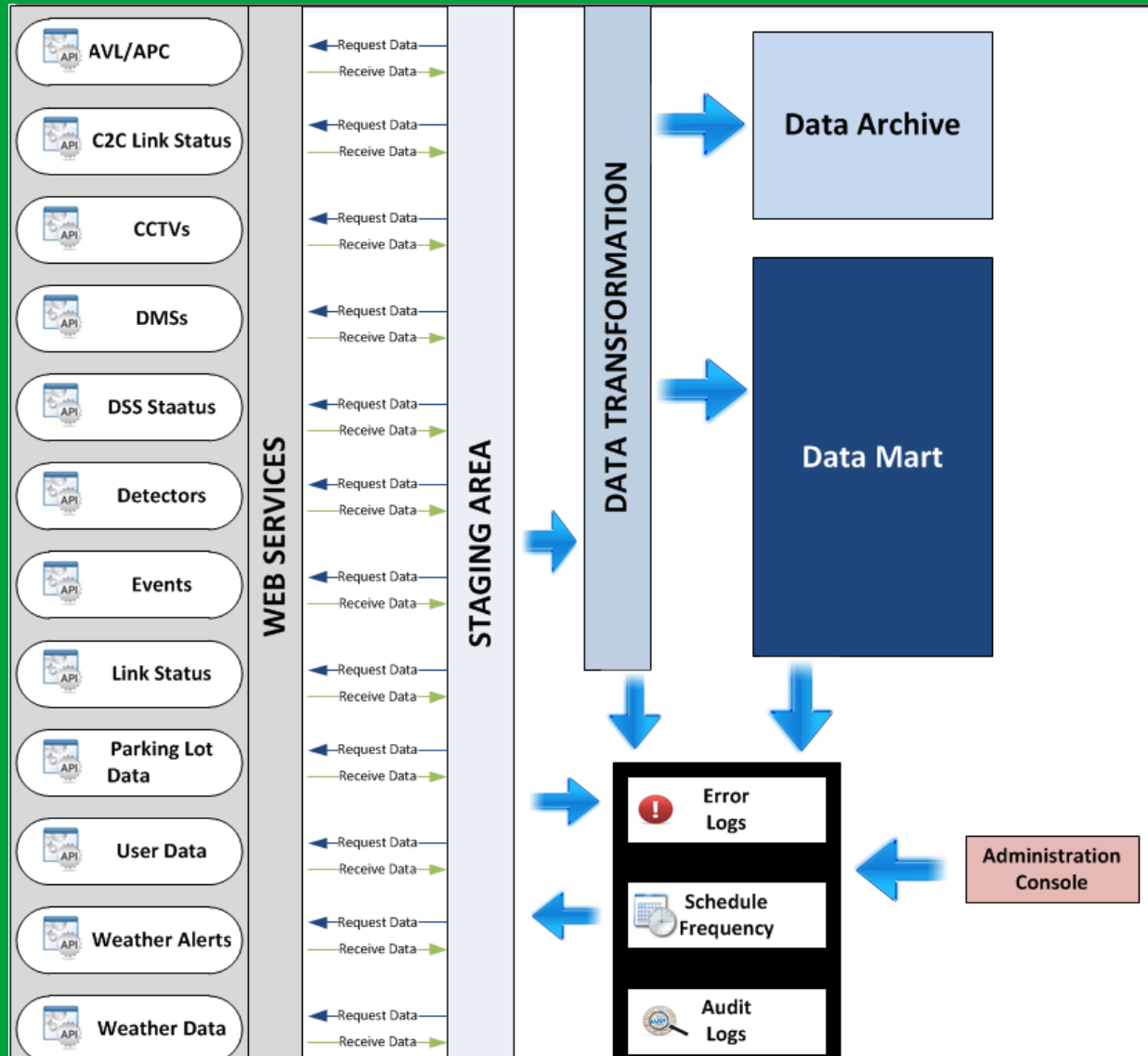
SYNC

PLANS >

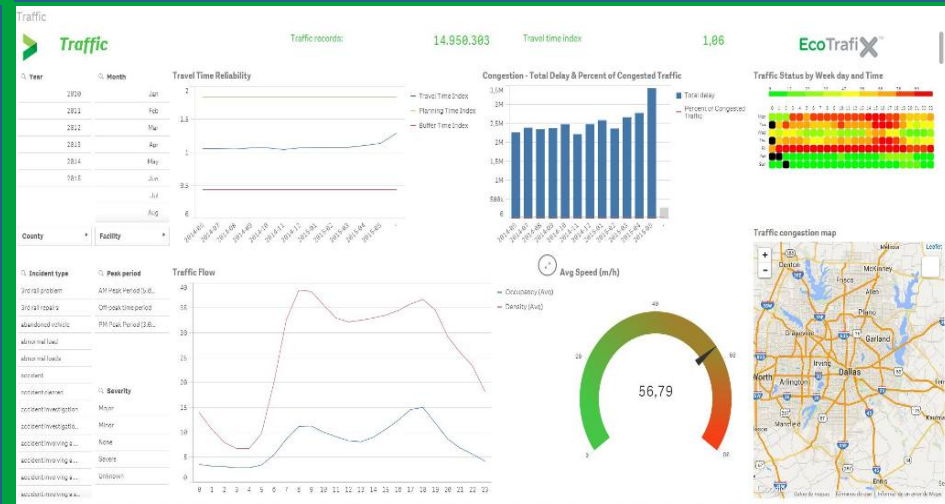
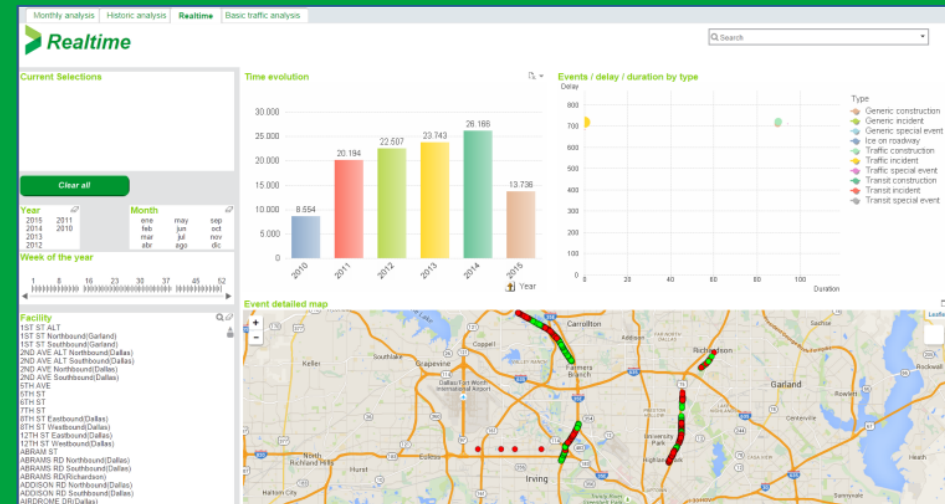
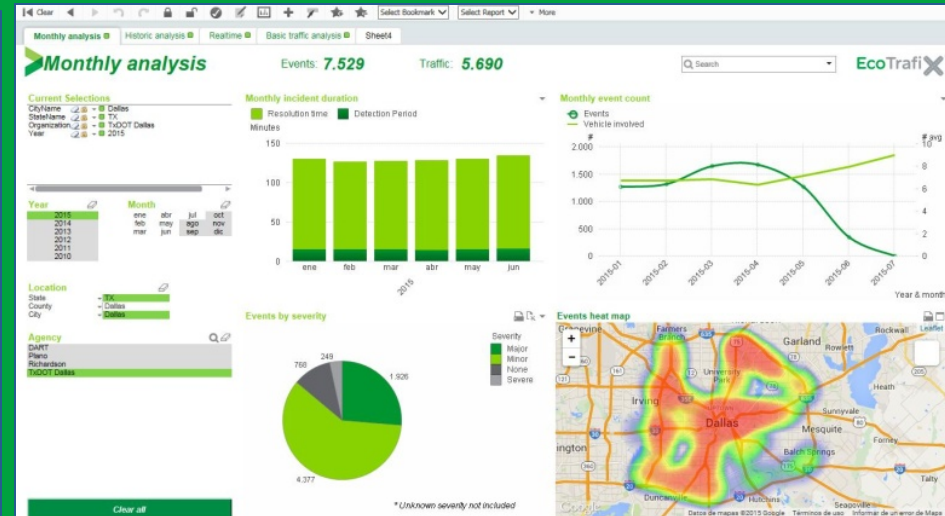
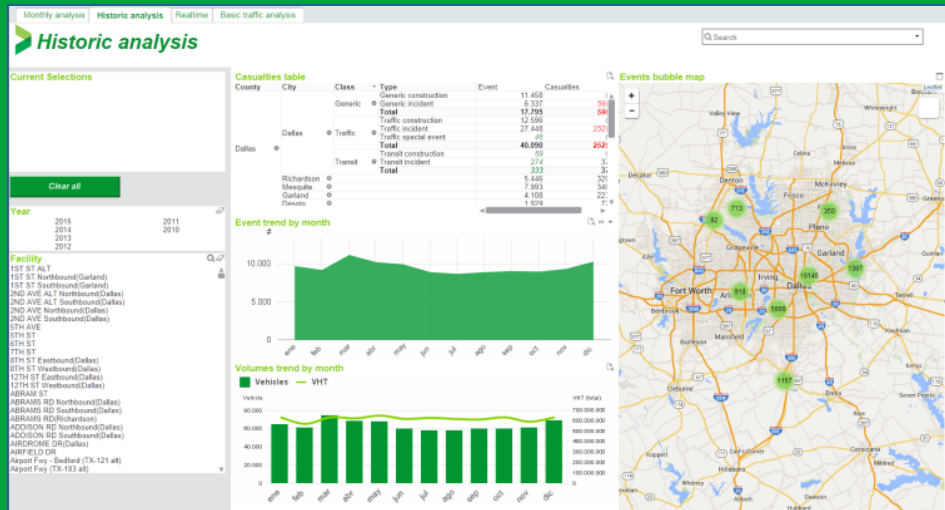
- LIGHT RAIL RESPONSE PLAN... 0/1
- PREVIEW OK
- Plan Implementation
- Notification
- DART: Activate BUS Birdge
- DART: Activate DMS Message
- TxDOT Dallas: TxDOT Dallas: Activate ...
- DART: Deactivate Bus bridge
- TxDOT Dallas: TxDOT Dallas: Deactivat...
- Plan Termination
- LRT Service disruption cleared



# Data Archival



# Performance Measures



Thanks