Integrated Corridor Management - US 75
DFW 511

Plano City Council

December 18, 2012

What is ICM?

- The integrated management of freeway, arterial, transit, and parking systems within a corridor
- Management of the corridor as a system, rather than the more traditional approach of managing individual assets

US DOT ICM Pioneer Sites

Stages for the Pioneer Sites:

- Stage 1 – Concept of Operations & Requirements
- Stage 2 – Analysis, Modeling and Simulation
- Stage 3 – Demonstration & Evaluation

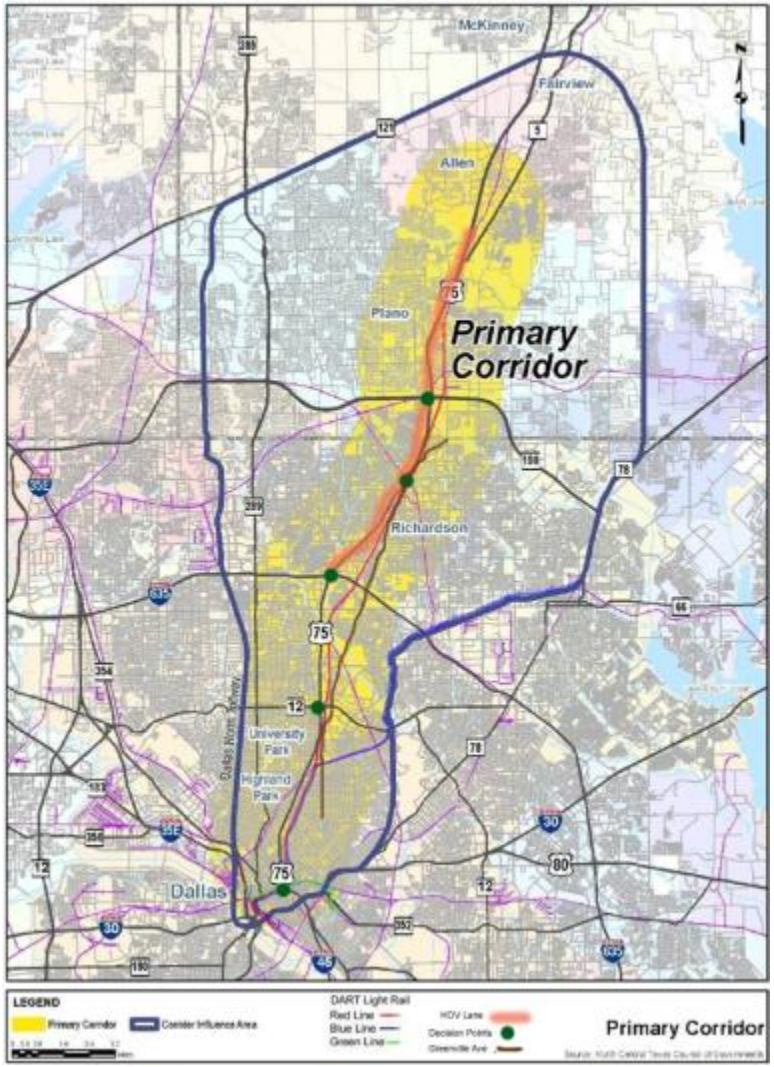
Photo by: Lisa Rising

Why ICM is needed in US 75 Corridor

- DFW is the 5th most congested region in US
- #1 worst region for growth in congestion
- Population is over 6 million, adding 1 million every 7-8 years
- US 75 is a critical, regional corridor
- Travel demand and congestion continues to grow
- No ability to expand freeway, arterials, or alternate routes
- Other freeways are scheduled for construction
- Significant employers in corridor
- Numerous special events throughout year
- Showcase for ITS integration in the region

US 75 Corridor Networks

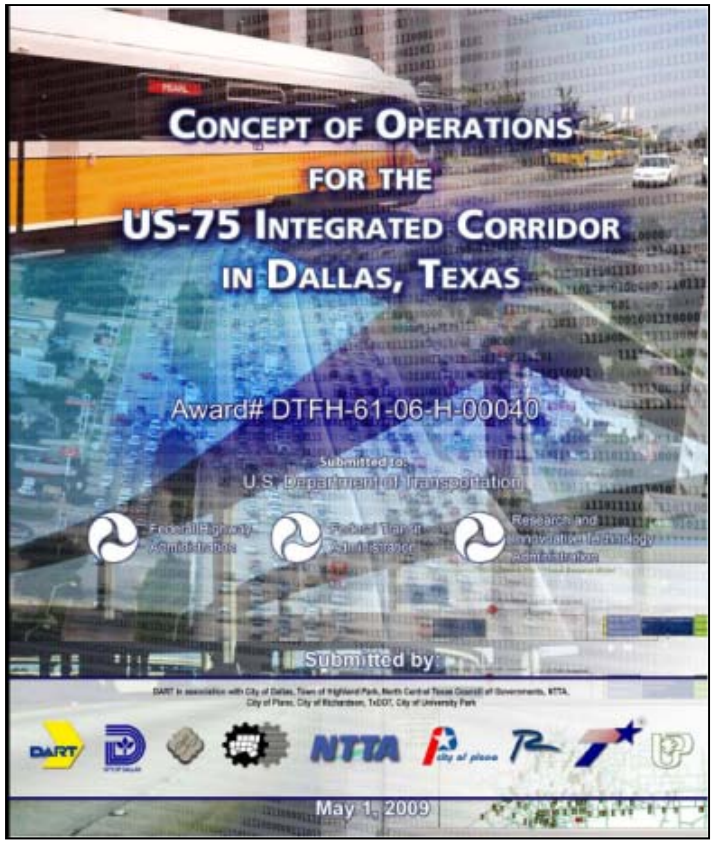
- Freeway with continuous Frontage Roads
- Managed HOV lanes
- Dallas North Tollway
- 167 Miles of Arterials
- DART Bus Network
- DART Light Rail
- Approx 900 Signals
- Multiple TMCs
- Regional ATIS



US 75 ICM Vision

Operate the US 75 Corridor in a true multimodal, integrated, efficient, and safe fashion where the focus is on the transportation customer

Stage 1: ConOps & SysReqs



Lessons Learned - Operational

- **Only "extra" capacity in US 75 corridor is on LRT**
- **Individual agencies operate their systems very well**
- **Opportunities exist through collaborative operation**
  - May require penalizing one user group to benefit overall corridor. For example a freeway incident;
    - May require decreasing cross street arterial green time in favor of more arterial green time parallel to freeway for diverted trips
- **Need for decision support tool to assess those operational trade-offs**
- **Need for better real-time arterial data**

Lessons Learned - Technical

- **Need for enhancing regional data sharing**
  - Must accelerate existing data sharing projects already scheduled for region
- **Need to determine methods for comparing and measuring multi-modal information**
- **Need additional detection for better real-time arterial data**
  - Travel times from toll tags may be most cost effective
- **Need for detailed system engineering knowledge**
  - Developing Concept of Operations and System Requirements was system engineering intensive

Lessons Learned - Institutional

- **Good partnerships are already in place**
- **Operational trust already exists from traffic management team, incident management cooperation and HOV lane operation**
- **Build on existing agreements / MOUs**
- **Build on existing oversight**
  - ICM reports to existing Regional ITS Committee

Stage 2: AMS - ICM Strategies

- **Advanced Traveler Information (all scenarios)**
  - Better pre-trip, en-route, and multi-modal information
- **Route Diversion Strategy (minor incident)**
  - Diverts traffic to parallel frontage roads
- **Route Diversion Strategy (major incident)**
  - Diverts traffic to frontage road and strategic arterials
- **Mode Diversion Strategy (major incident)**
  - Diverts travelers to DART Red Line
- **Combined Route and Mode Diversion Strategy**
  - Diverts travelers to frontage roads, strategic arterials, and DART Red Line

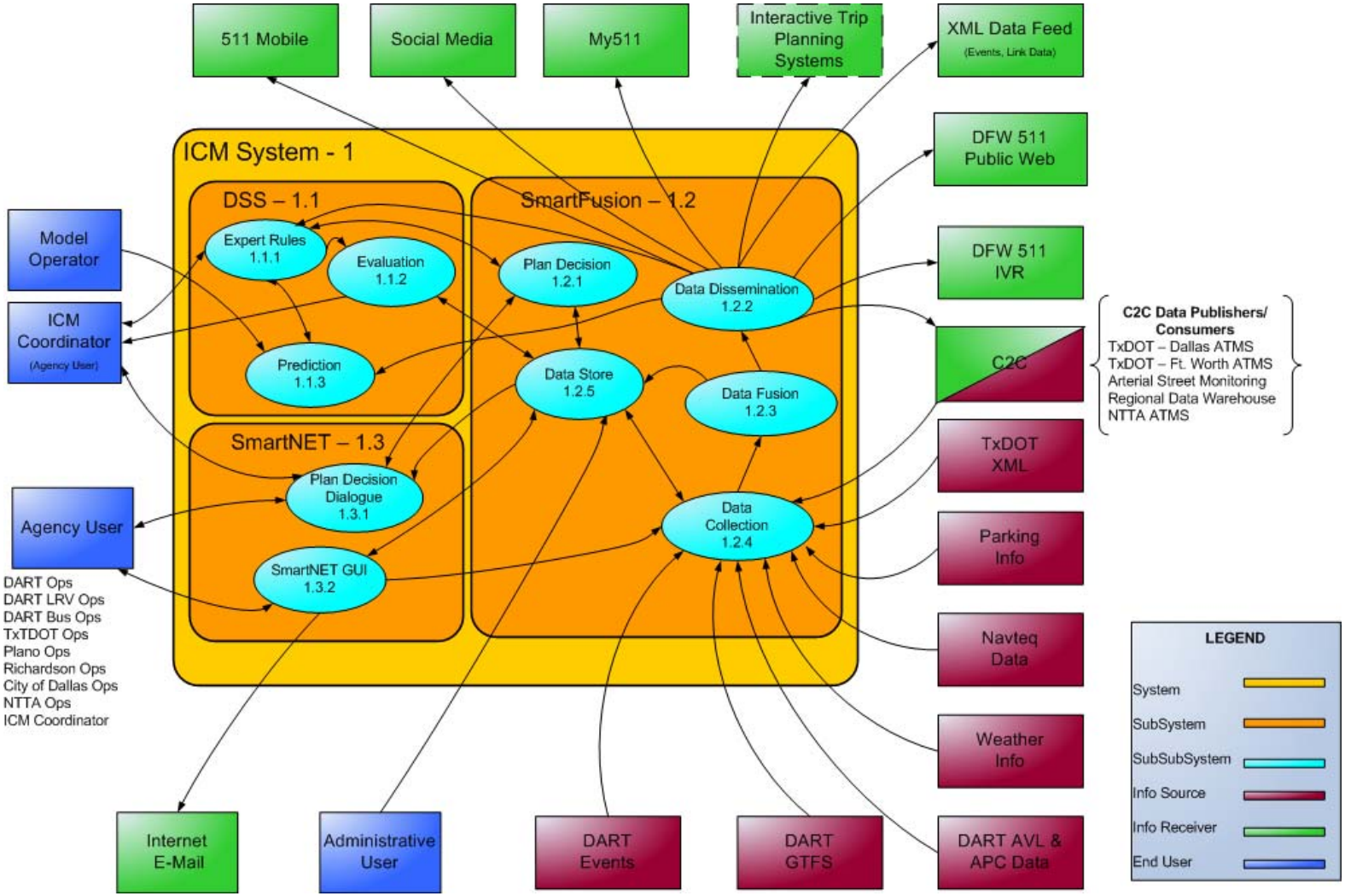
Summary Results

	San Diego	Dallas	Minneapolis
Annual Travel Time Savings (Person-Hours)	246,000	740,000	132,000
Improvement in Travel Time Reliability (Reduction in Travel Time Variance)	10.6%	3%	4.4%
Gallons of Fuel Saved Annually	323,000	981,000	17,600
Tons of Mobile Emissions Saved Annually	3,100	9,400	175
10-Year Net Benefit	$104M	$264M	$82M
10-Year Cost	$12M	$14M	$4M
Benefit-Cost Ratio	10:1	20:1	22:1

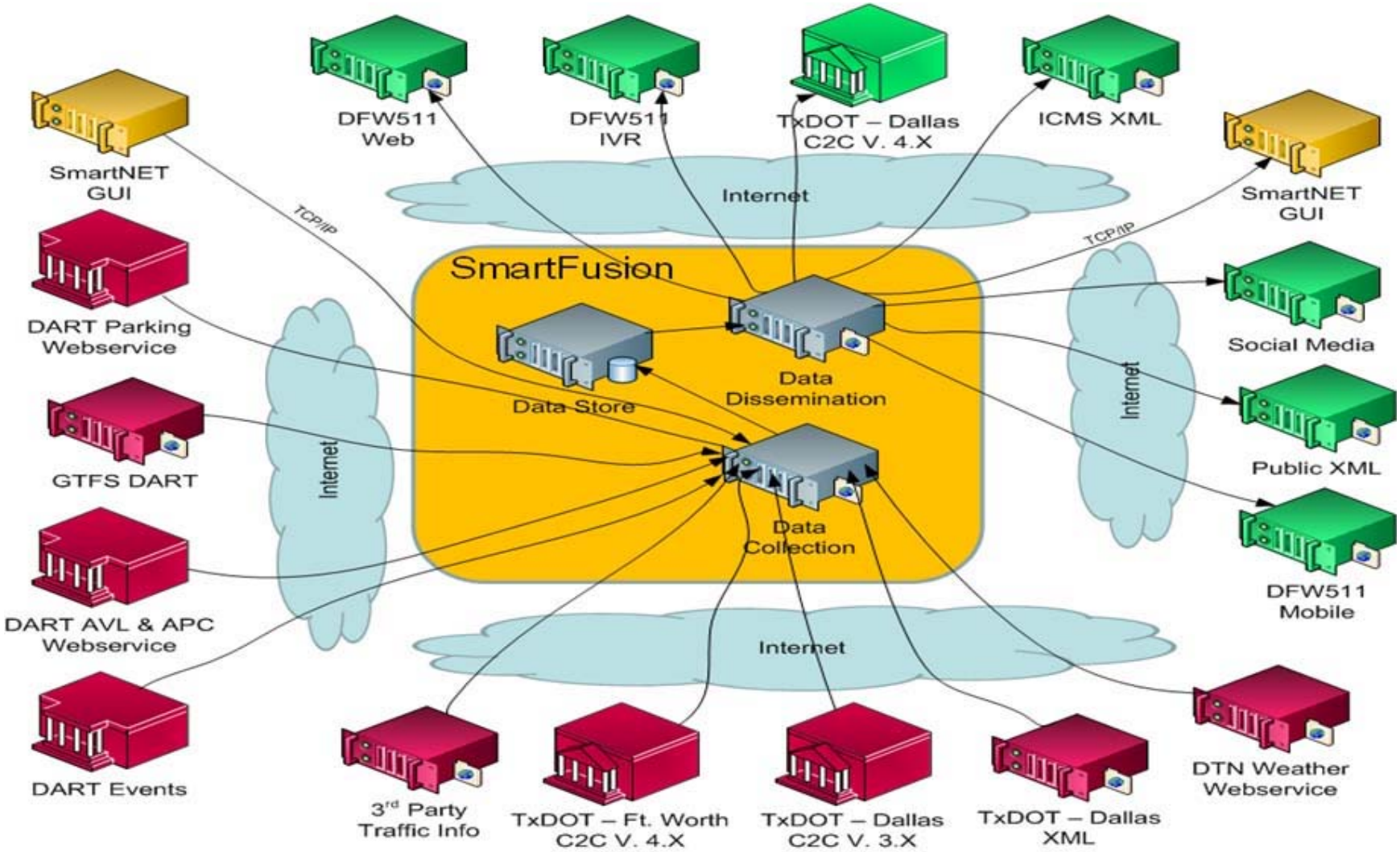
Benefit - Cost

- **$16.5 M in Benefits for $1.62M Cost per year**
- **$278.8 M Benefits for $13.6M Cost over 10 years**
- **Estimated B/C over the 10-year life-cycle of the project is 20.4 : 1**

ICMS Logical Architecture



SmartFusion Data Feeds

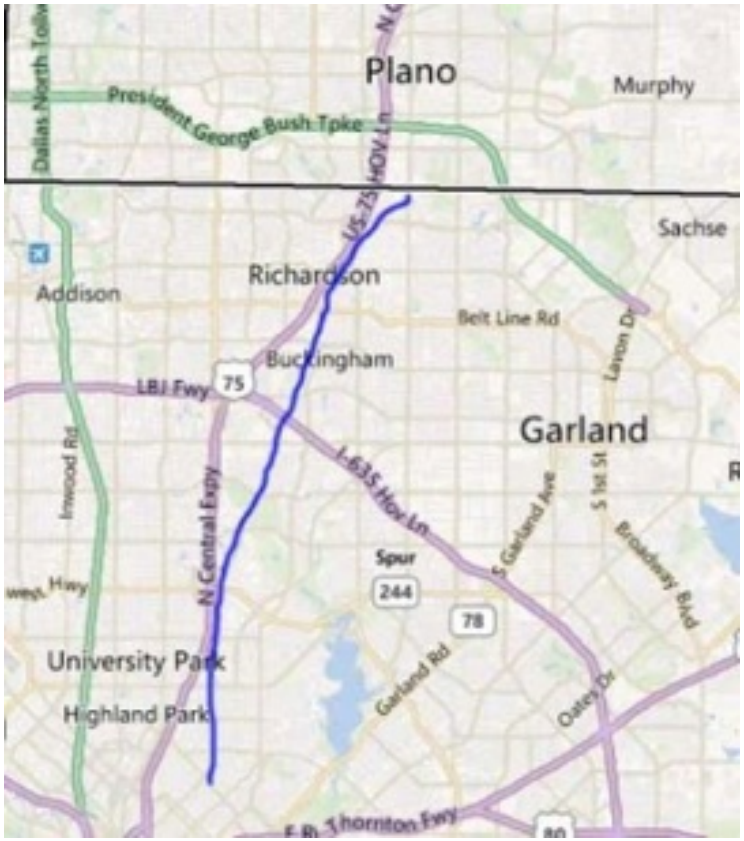


ICM Applications

- ✓ Responsive Traffic Signal System
- ✓ Arterial Street Monitoring System
- ✓ Parking Management
- ✓ Real-Time Transit Vehicle Information
- ✓ Freeway Management
- ✓ HOV Lane Management
- ✓ Weather
- ✓ SmartNET
- ✓ DSS
- ✓ 511

Responsive Traffic Signal

- **Develop new Traffic Signal Timing Plans for Greenville Ave**
- **Develop Event Specific Timing Plans**
- **DSS will recommend plans for specific events**



ICM Arterial Street Monitoring

- **Proven Bluetooth Technology**
- **Have deployed about 40 detectors along diversion routes**
- **DSS will use Travel Time and Speeds on diversion routes to select recommended plan**
- **External Data Sources**

Parking Management

- **5 Park & Ride lots along LRT Red Line**
- **Monitor availability at each Park & Ride lot**
- **Publish to DSS and 511 System**
- **Publish to TxDOT DMS**

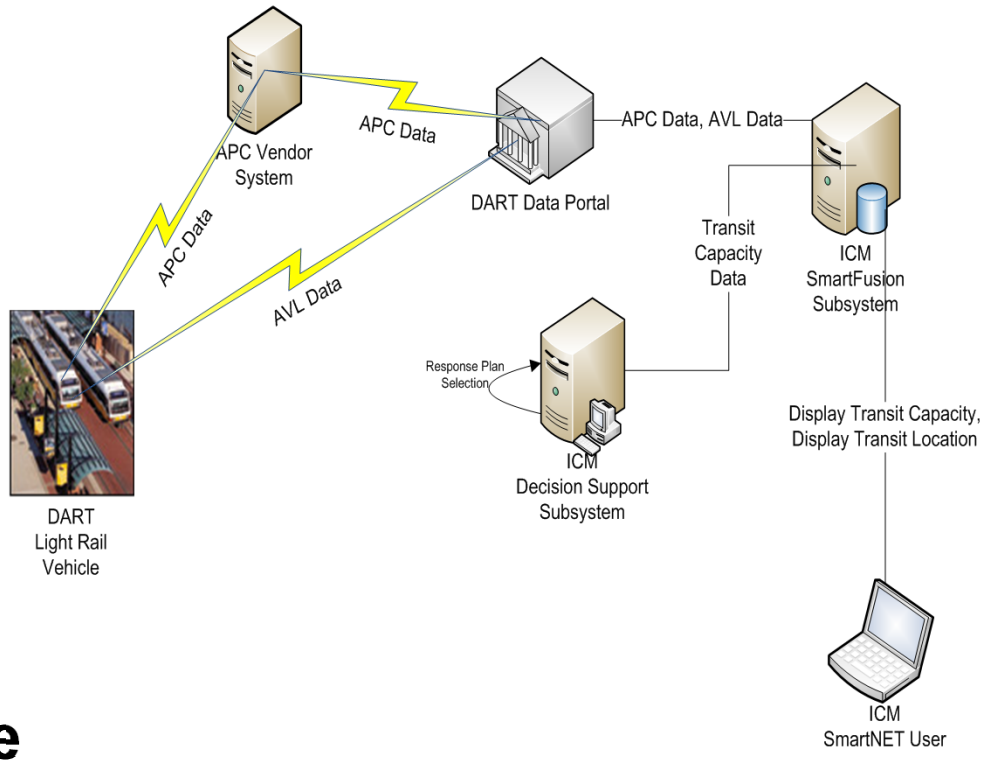
Real Time Transit Vehicle Information

Vehicle location

Time to arrive at next stop

Transit schedule

Available capacity



Install APC on Red Line cars

Transmit & integrate real time AVL & APC data to ICM System

Freeway Management

Diversion Plan:

Minor Incidents

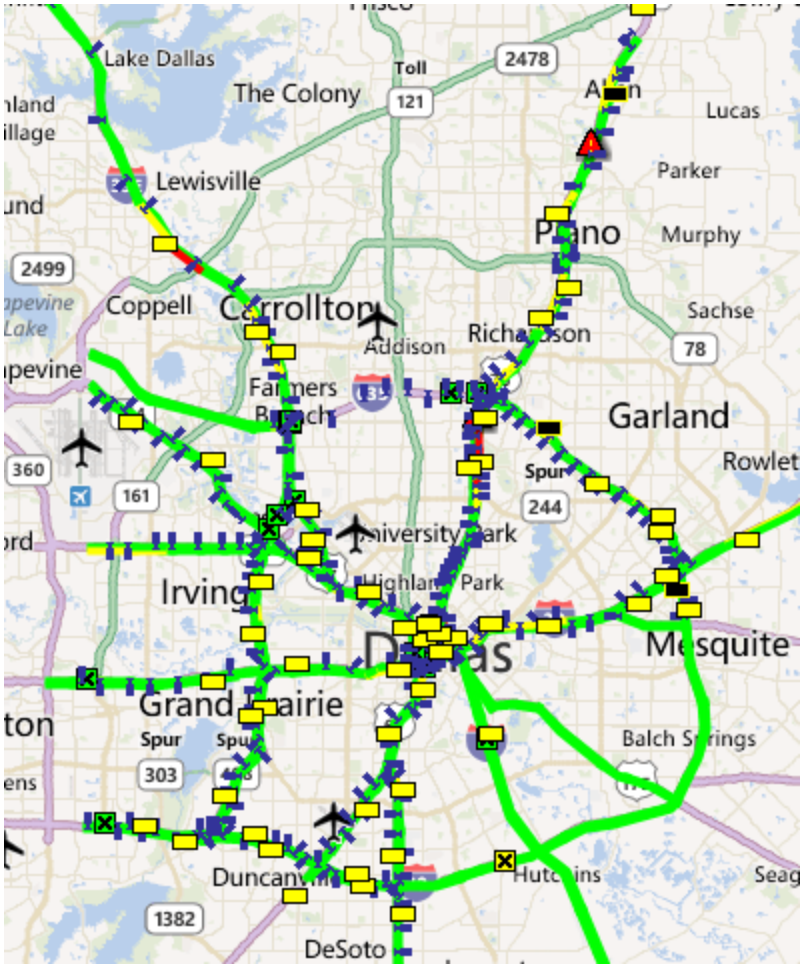
1- lane & shoulder blocked, <2-mile queue:

- **Divert US 75 traffic to Frontage Rd**

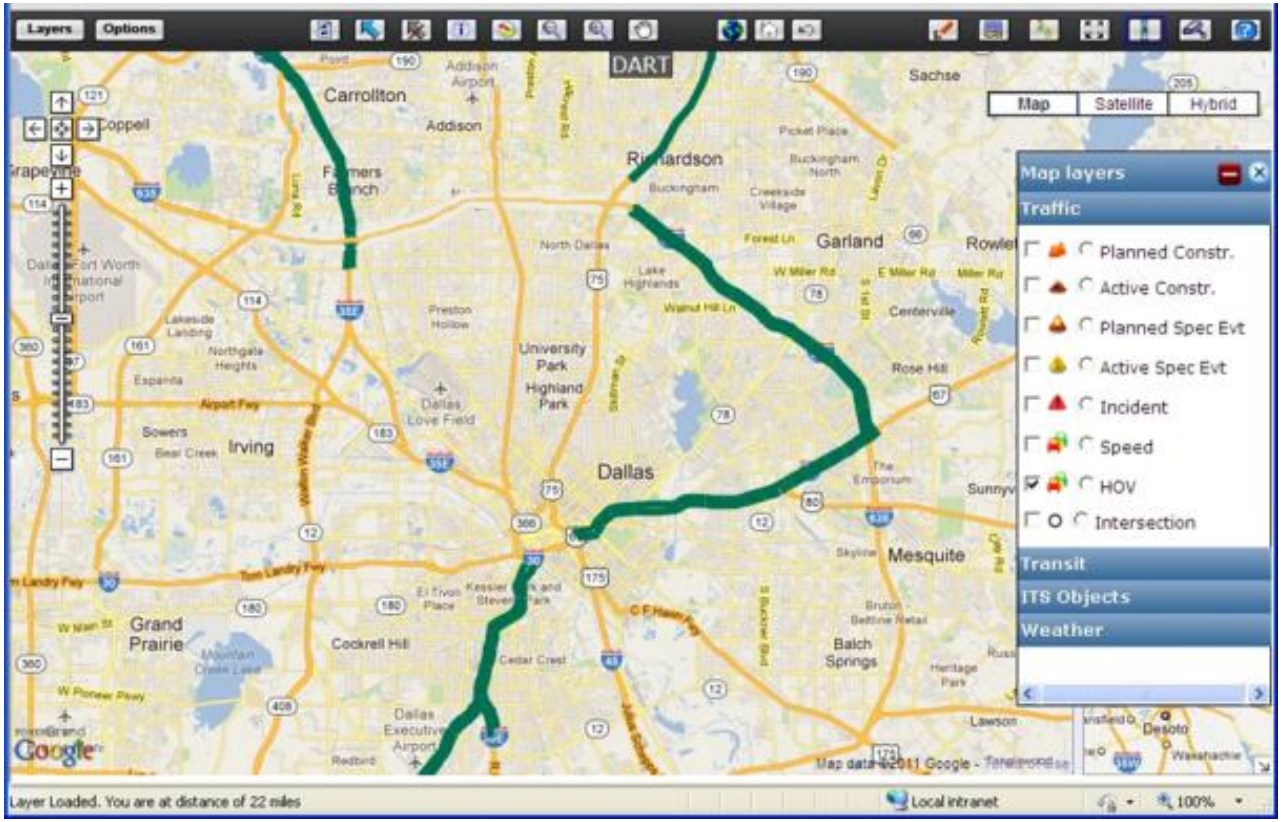
Major Incidents

2- lanes or more blocked, 2 - 4 mile queue:

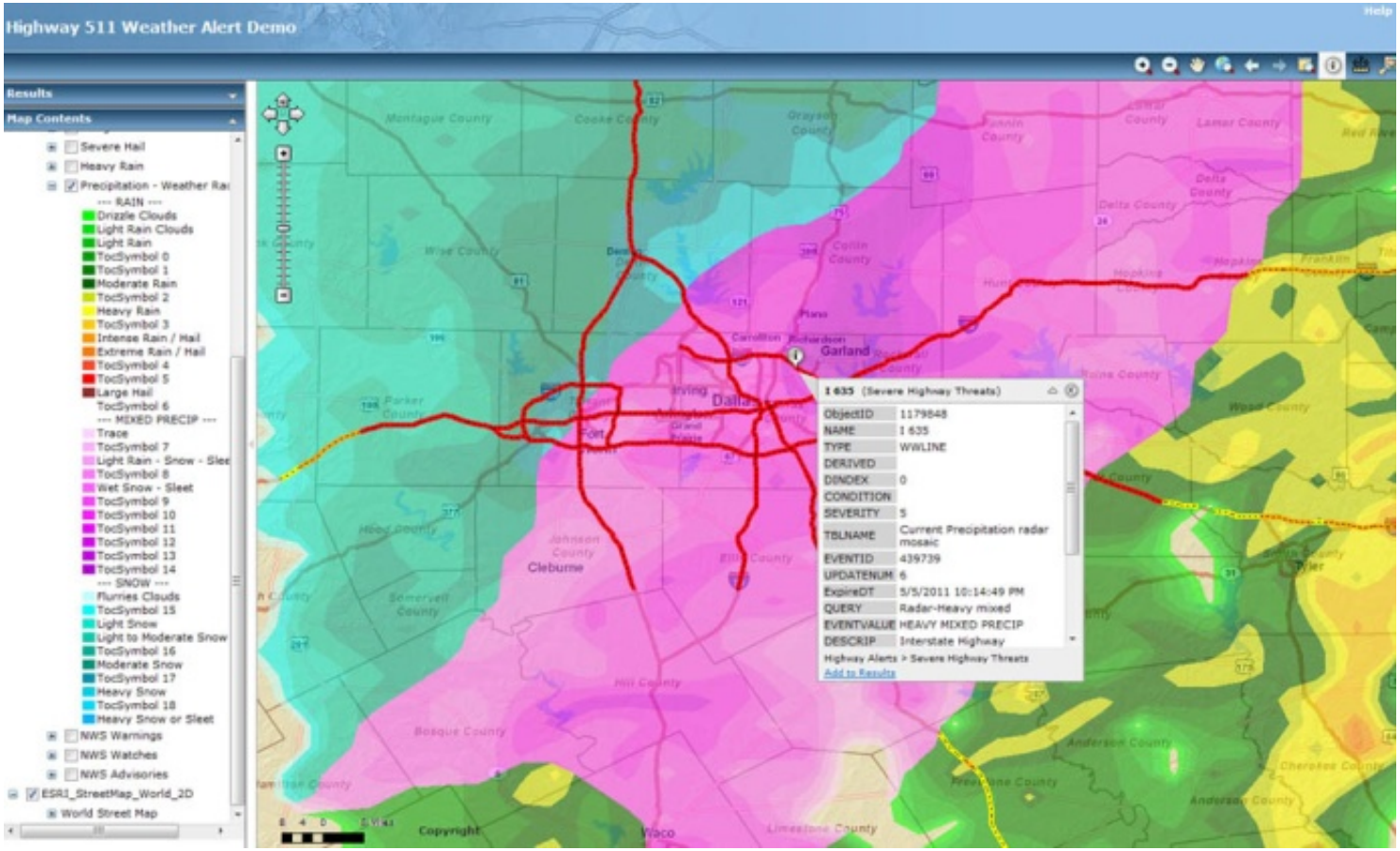
- **Divert US 75 traffic to (any or all): Frontage Road**
- **Greenville Ave**
- **Red Line LRT**



HOV Lane Management System



Weather: Dallas Ice Storm



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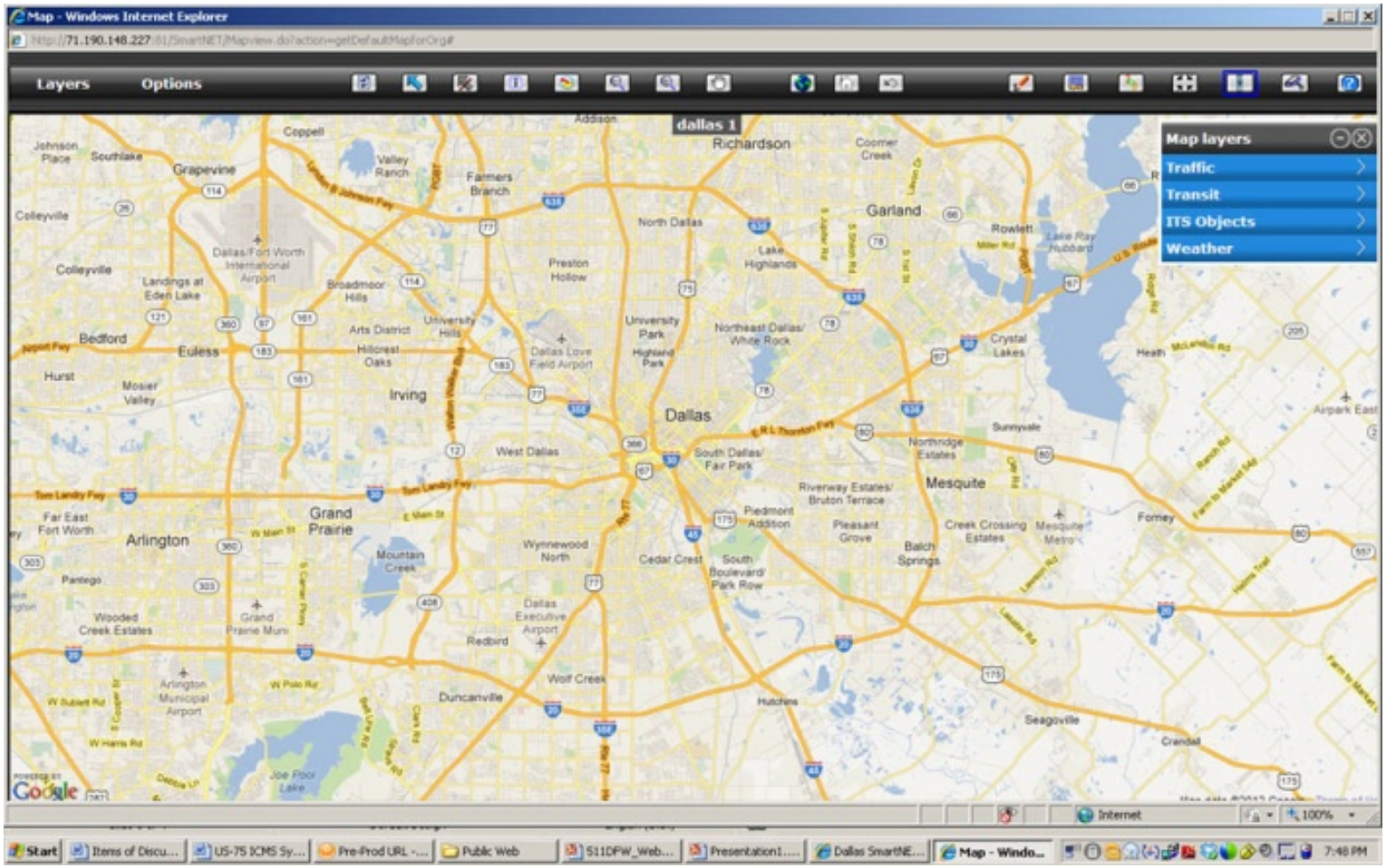
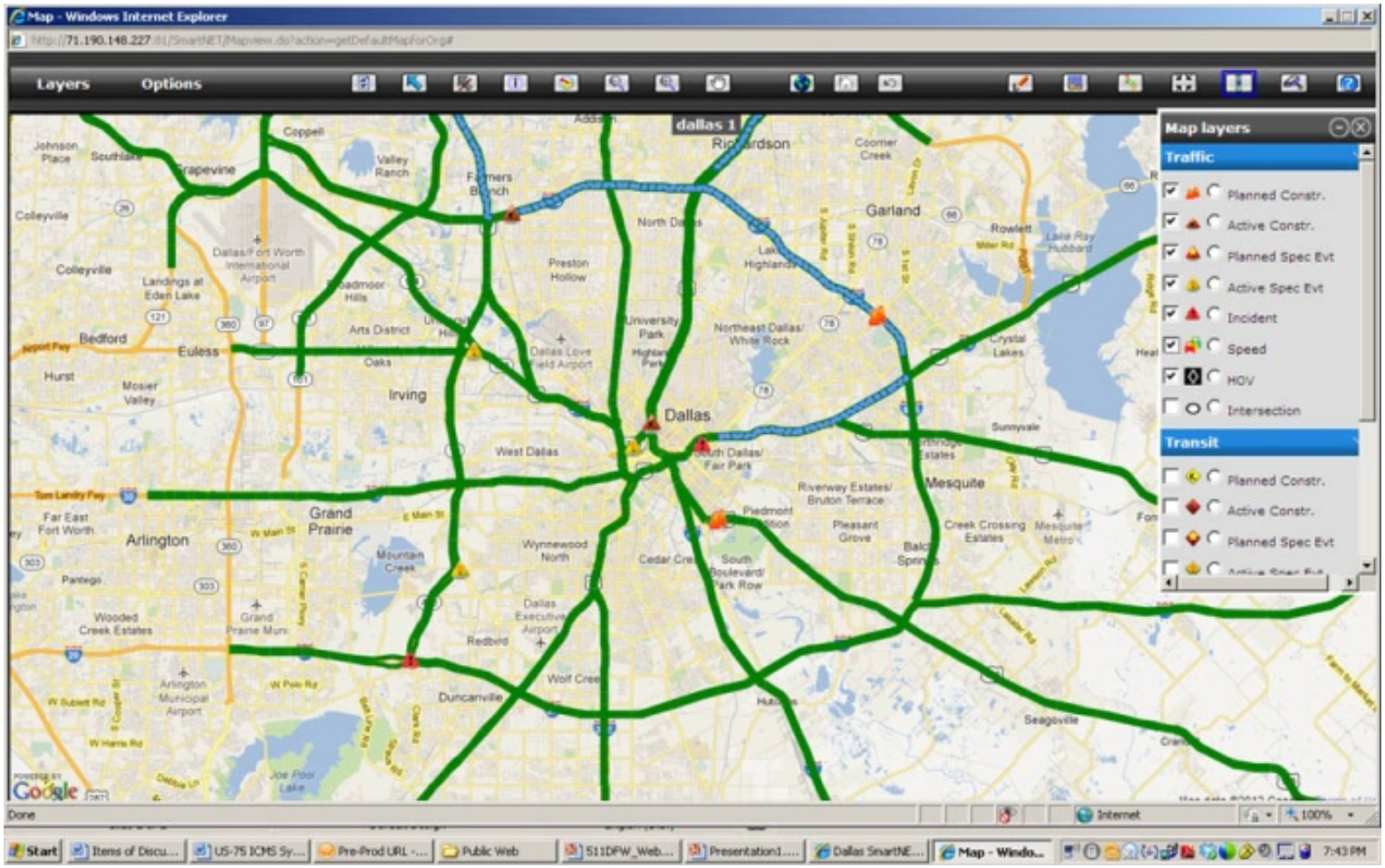
SmartNET: Base Map



SmartNET: Map Interface



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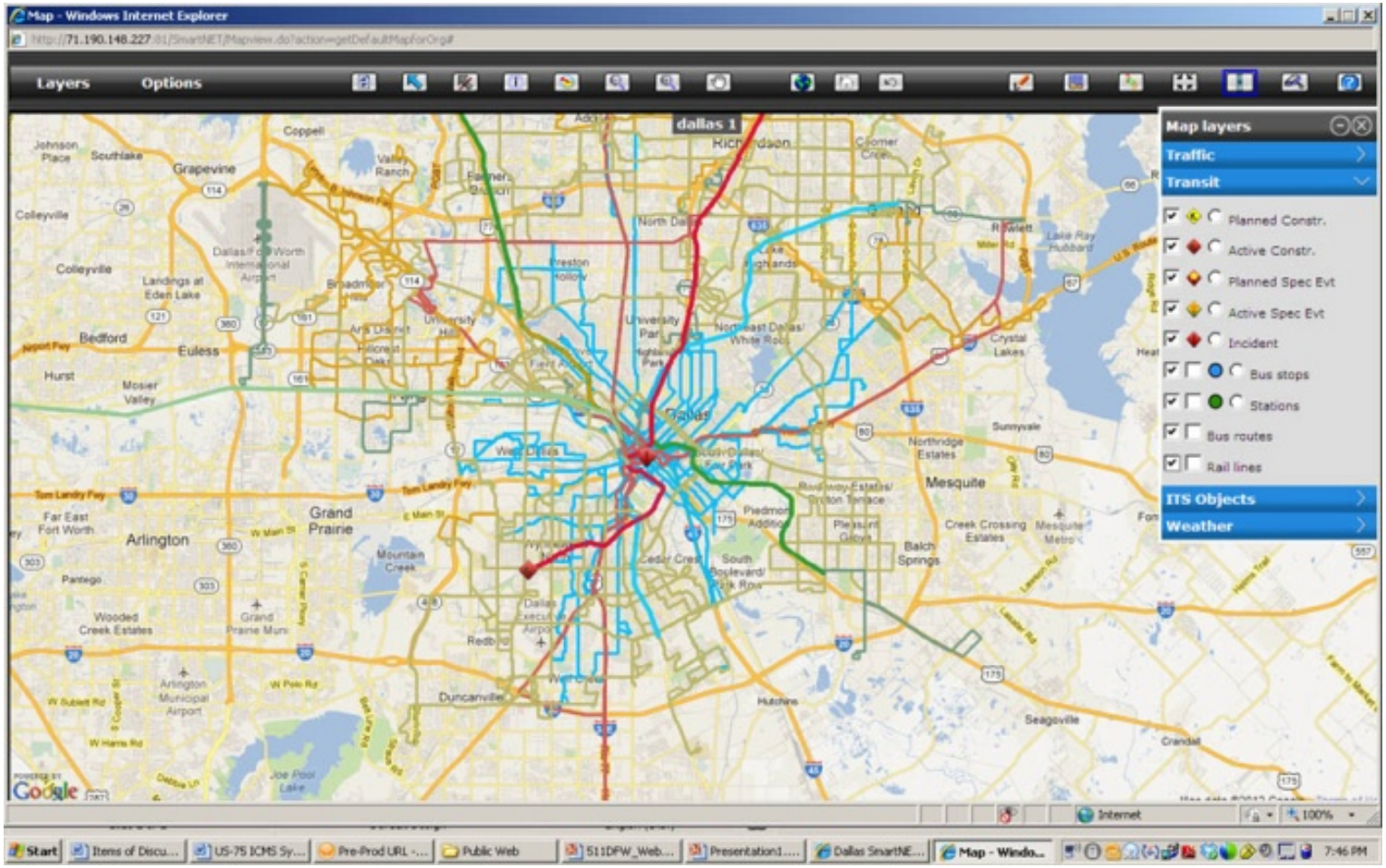
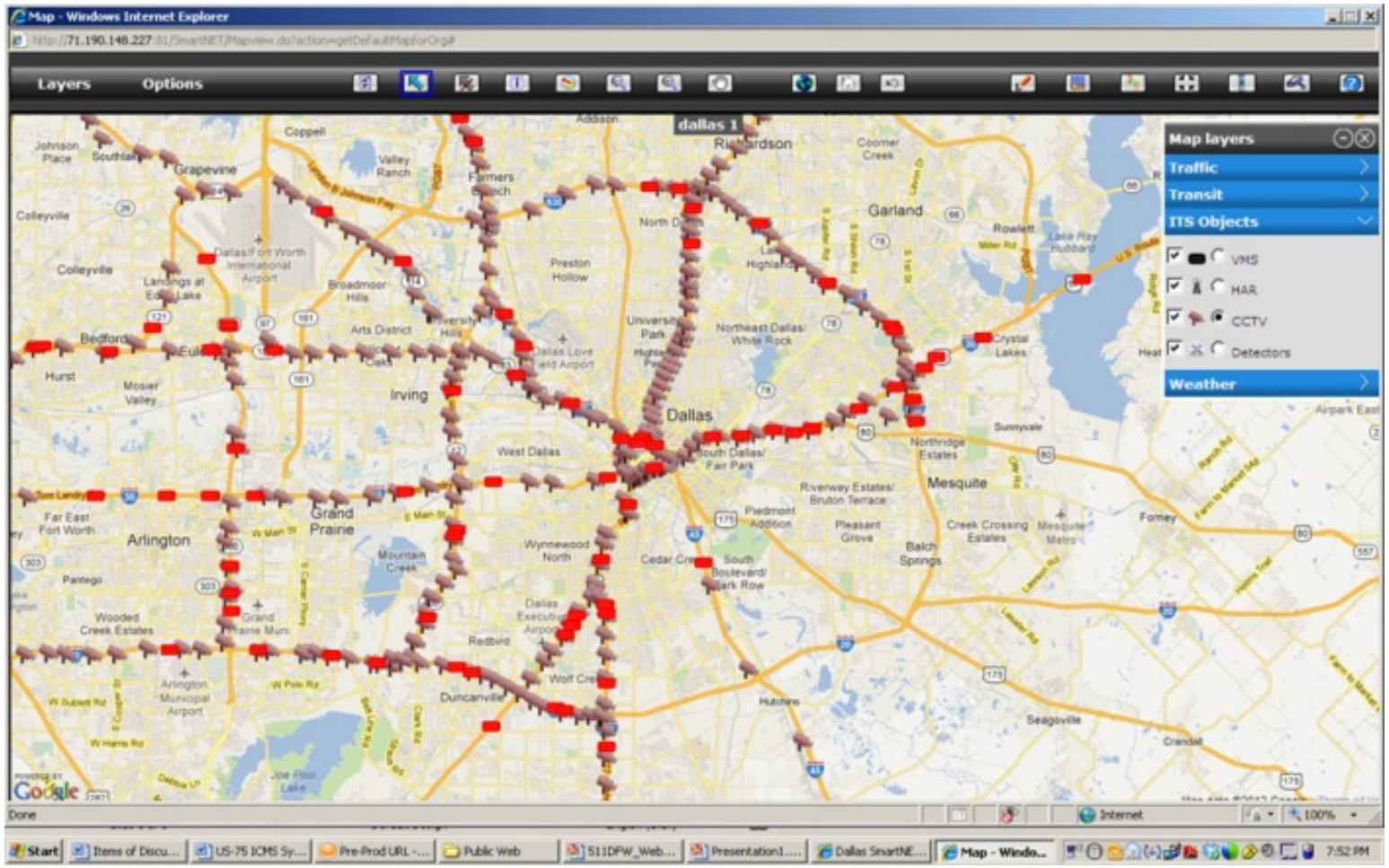
SmartNET: DART Transit

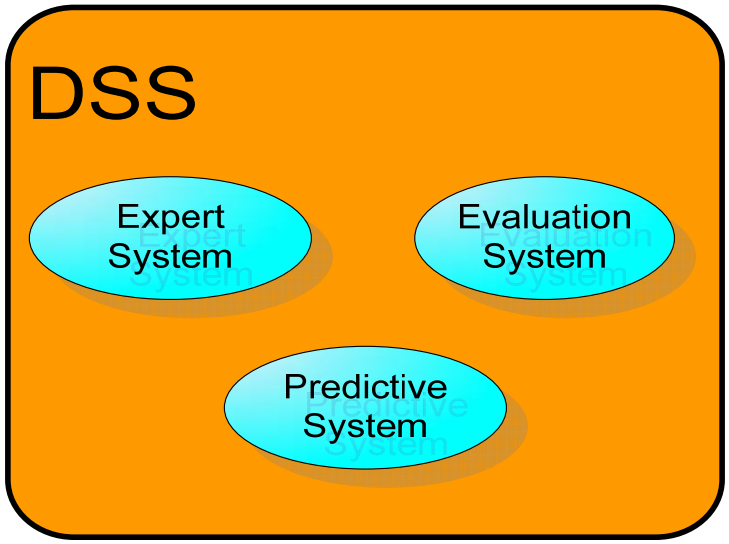


SmartNET ITS Devices

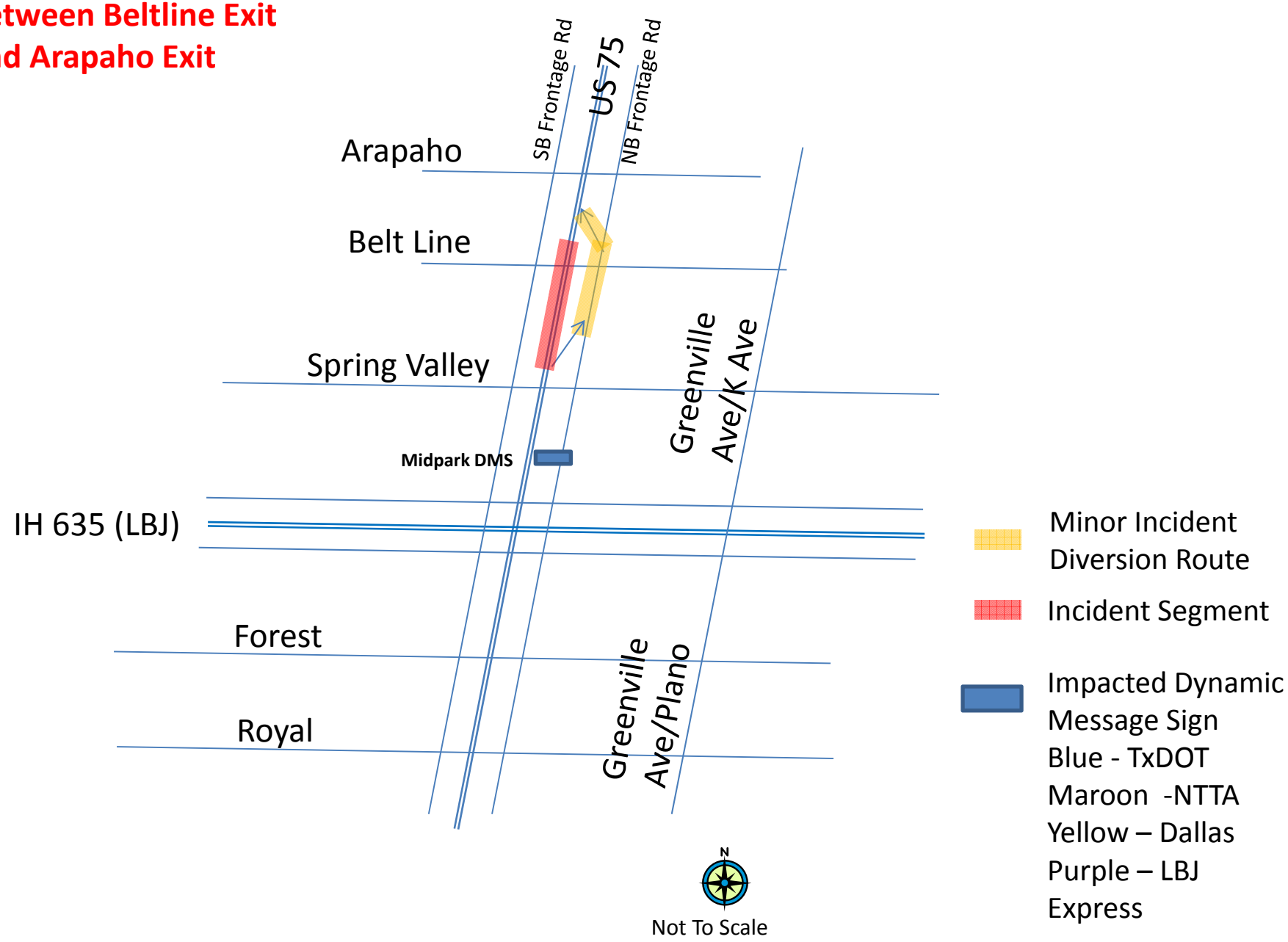


ICMS - Decision Support System

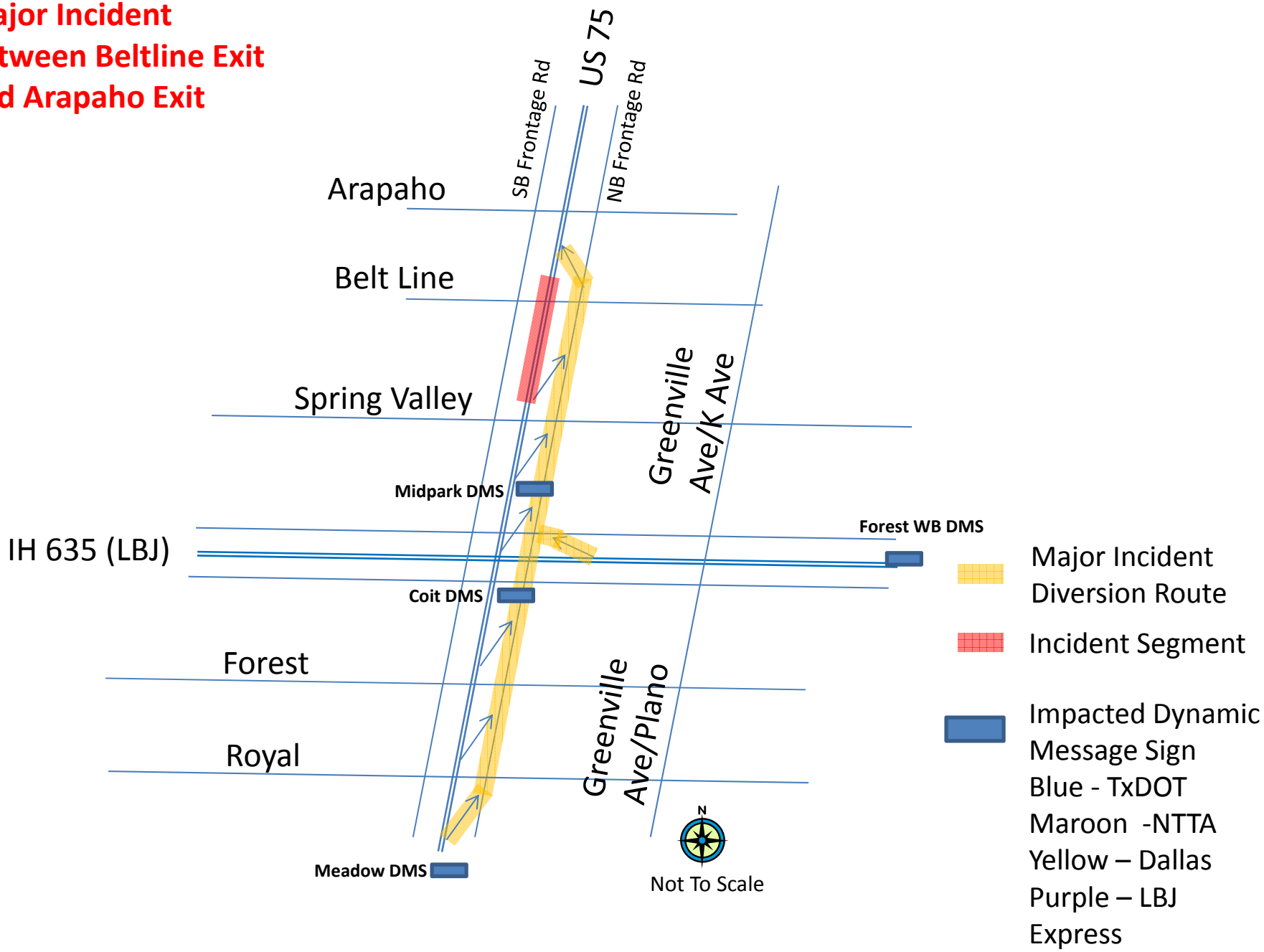
- **Receives data from SmartNET/SmartFusion**
- **Evaluates various response plan options**
- **Provides recommended plan to partner agencies via SmartNET**



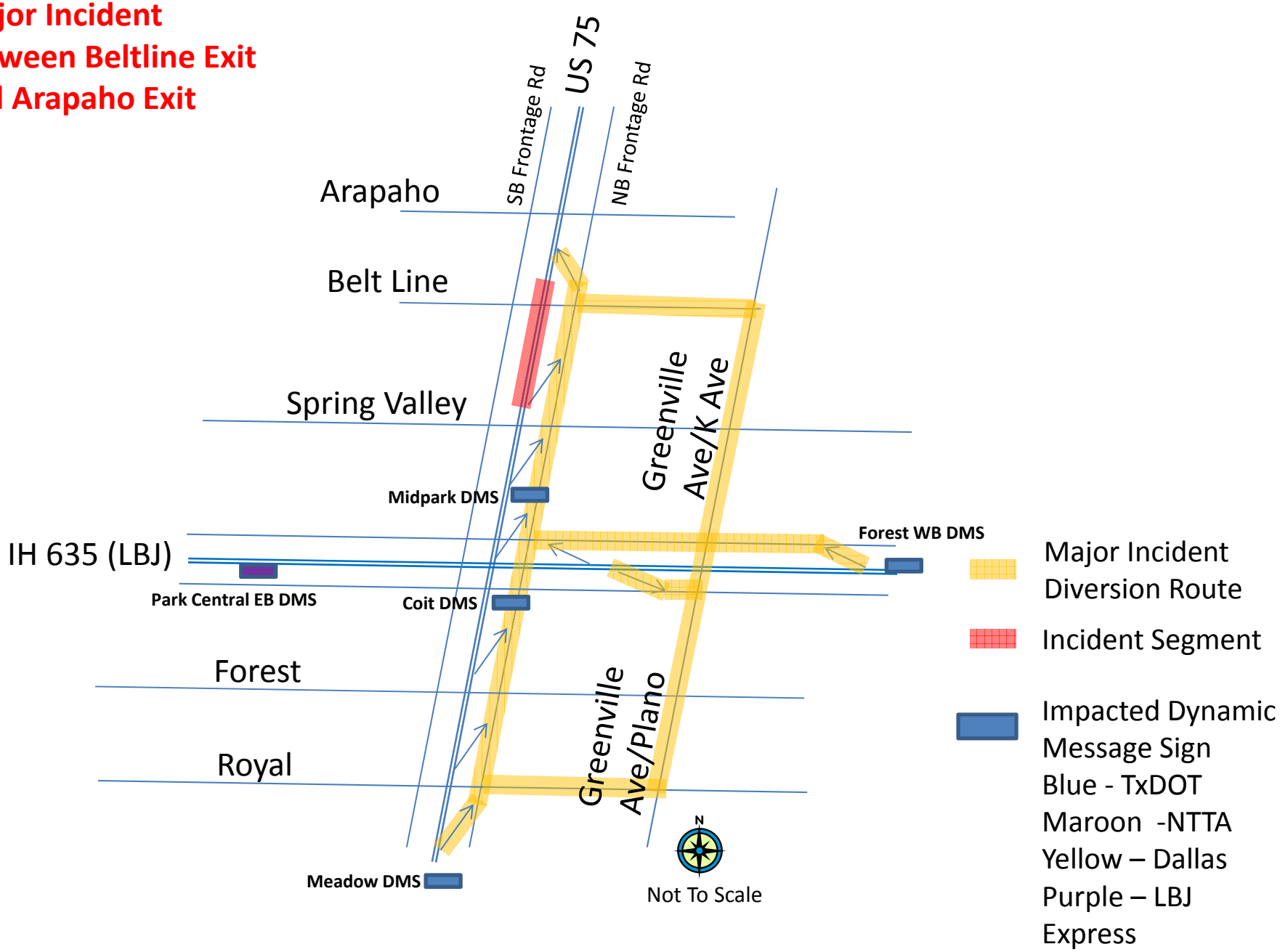
N 75 N 202
Minor Incident
between Beltline Exit
and Arapaho Exit



J 75 N 254
Major Incident between Beltline Exit and Arapaho Exit



J 75 N 255
Major Incident
between Beltline Exit
and Arapaho Exit



Creation of a Response Plan

Frontage Road Diversion Response Plan

Traveler Info	Frontage Rd Diversion	Arterial Street Diversion	Mode Diversion
Do Nothing	Do Nothing	Do Nothing	Do Nothing
Comparative TT	Timing Plan #1	Timing Plan #11	Divert to Red Line
DMS Plan #1	Timing Plan #2	Timing Plan #12	Timing Plan #21
DMS Plan #2	Timing Plan #3	Timing Plan #13	Timing Plan #22
DMS Plan #3	Timing Plan #4	Timing Plan #14	Additional Parking
511		Timing Plan #15	Initiate Shuttle Service
Mobile Alert		Timing Plan #16	Add Rail Car

DSS Concept

Monitor US 75 Congestion

Divert to Frontage Road

Divert to Frontage Road and Greenville Ave

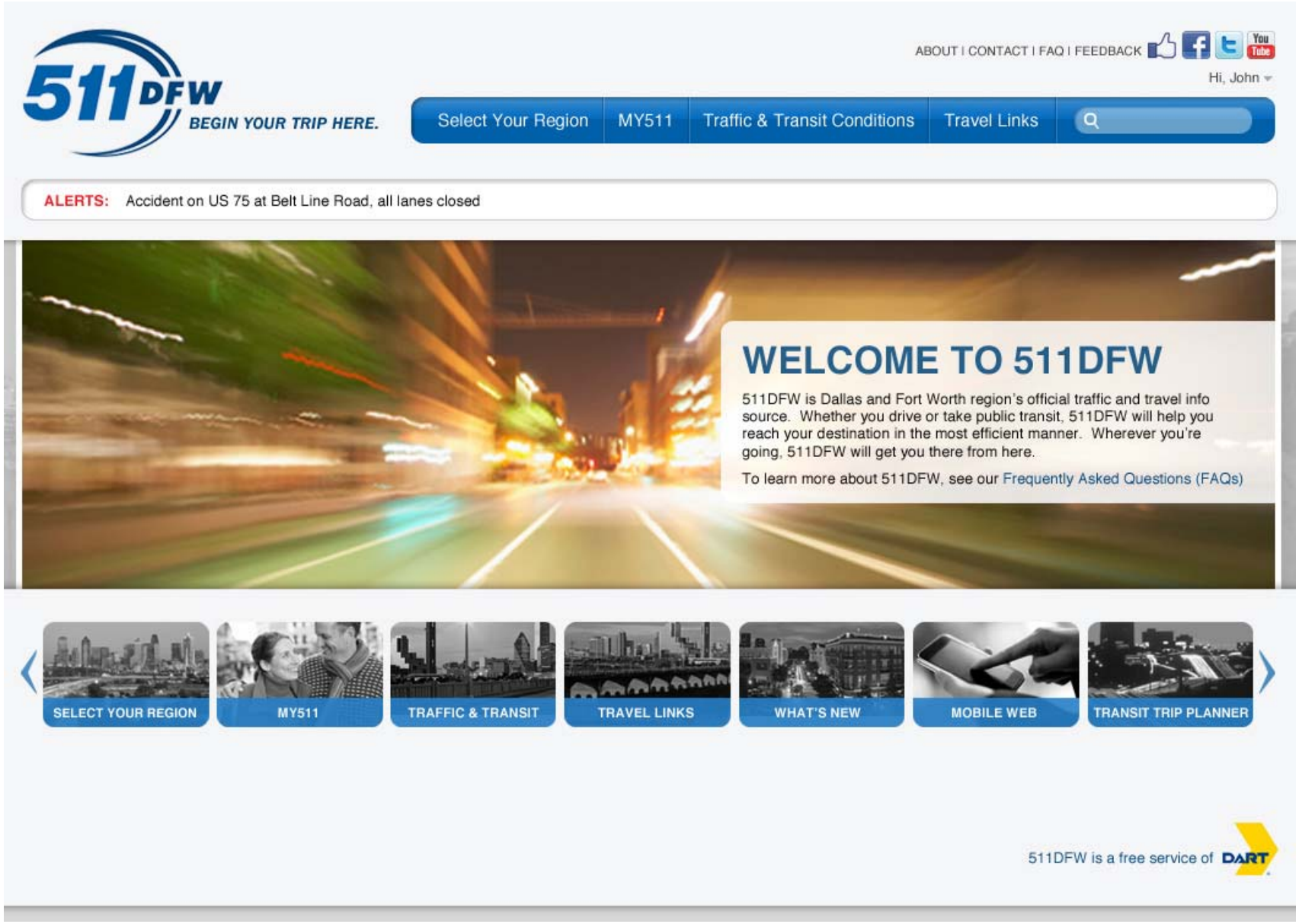
Divert to Frontage Road, Greenville Ave & DART Red Line

511 DFW

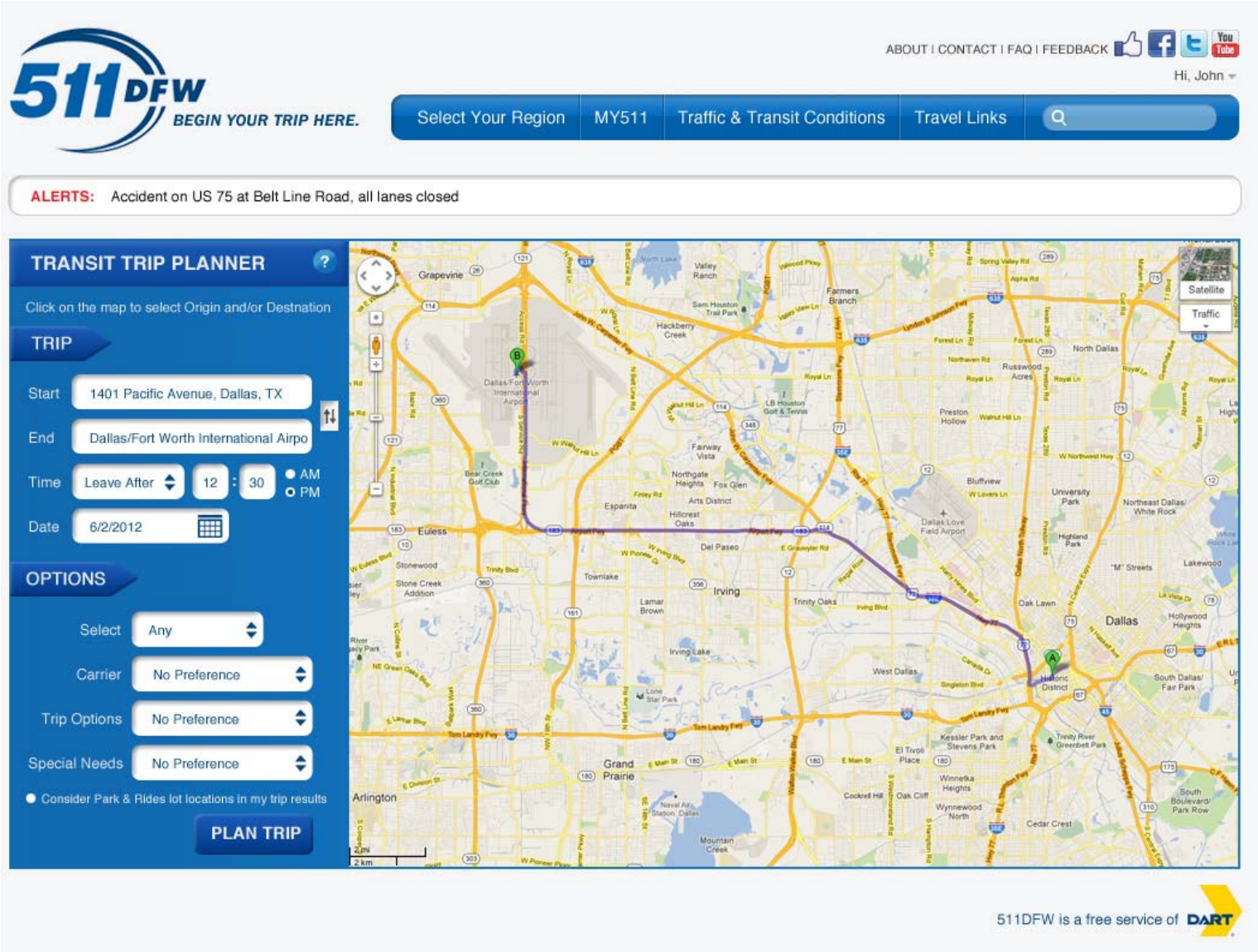
Multimodal Traffic and Transit Information disseminated through:

- **A Public Web Site**
- **Interactive Voice Response (IVR)**
- **A Mobile Web Site and Mobile Application**
- **My511 (Web, IVR, Alerts)**
- **Social Media**

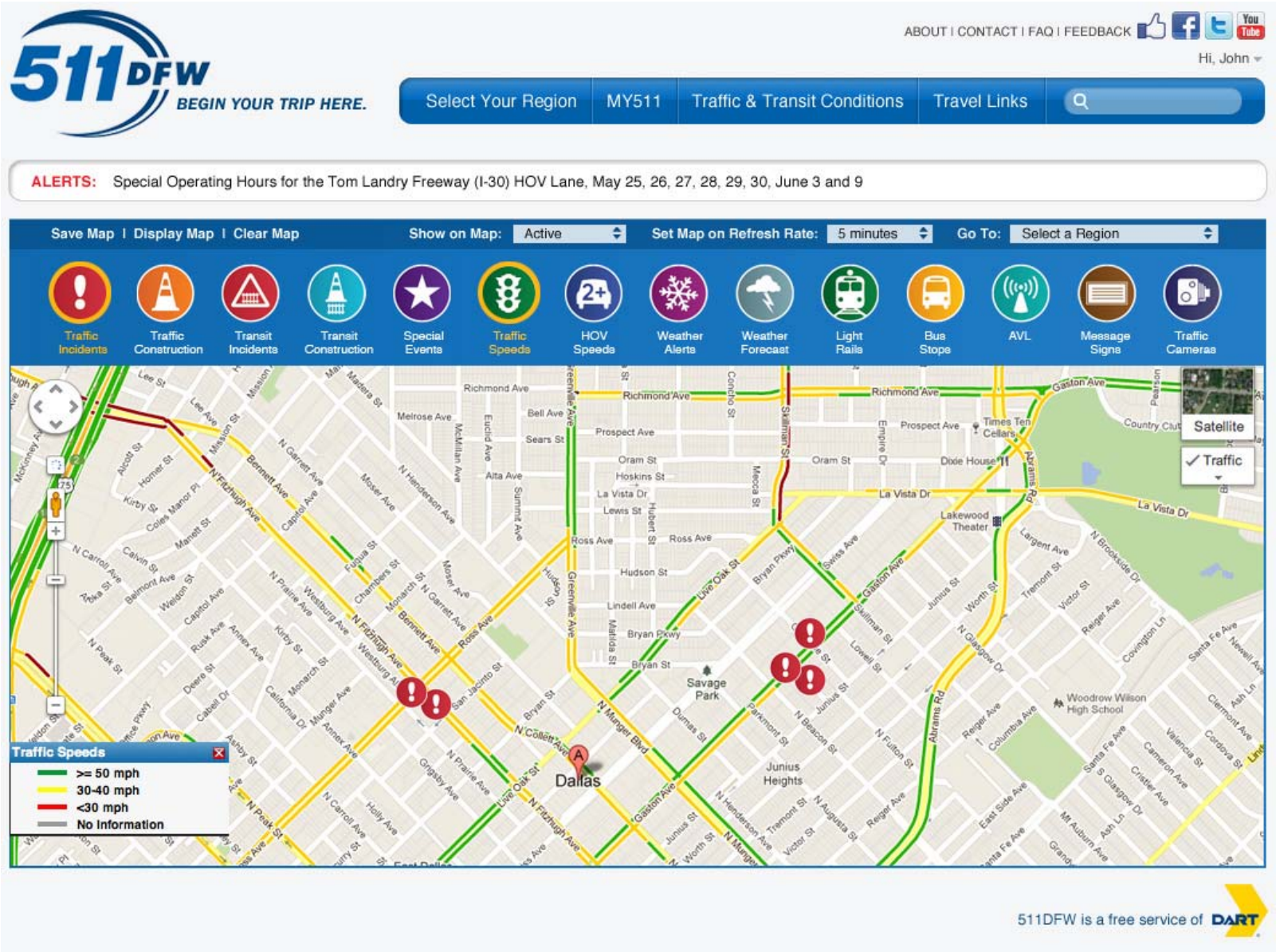
511DFW Public Website



Regional Trip Planner



Map


511DFW
BEGIN YOUR TRIP HERE.
ABOUT | CONTACT | FAQ | FEEDBACK
Hi, John
Select Your Region
MY511
Traffic & Transit Conditions
Travel Links
ALERTS: Special Operating Hours for the Tom Landry Freeway (I-30) HOV Lane, May 25, 26, 27, 28, 29, 30, June 3 and 9
Save Map | Display Map | Clear Map
Show on Map: Active
Set Map on Refresh Rate: 5 minutes
Go To: Select a Region
Traffic Incidents
Traffic Construction
Transit Incidents
Transit Construction
Special Events
Traffic Speeds
HOV Speeds
Weather Alerts
Weather Forecast
Light Rails
Bus Stops
AVL
Message Signs
Traffic Cameras
Satellite
Traffic
Traffic Speeds
>= 50 mph
30-40 mph
<30 mph
No Information
Dallas
Savage Park
Junius Heights
Lakewood Theater
Woodrow Wilson High School
511DFW is a free service of DART

Cost

- **Funded by the US DOT: $5.31M**
- **Local Share by project partners: over $3M**
- **Total project value: $8.38M**
- **Additional federal funds: $0.9M**

Schedule

- **Design Phase: Completed 12/15/2011**
- **Build Phase: 11/21/2012**
- **System Acceptance Test: 2/15/2013**
- **Go-Live: 4/13/13**

Committees & Lead Agencies

• Operations / DSS	TxDOT
• Policy & Programming	NCTCOG
• Signal Systems	Richardson
• Transit Applications	DART
• Outreach & Marketing	DART
• SmartNet / SmartFusion	DART
• Parking Management	Plano
• Arterial Street Monitoring	Dallas
• Video Sharing	NCTCOG
• 511 System	DART
• C2C	NCTCOG
• AMS / Evaluation	DART

For More Information

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