TELVENT

Smart Information for a Sustainable World

Integrating *Clarus* Data with the 511 New York Traveler Information System

Road Weather Management Stakeholder Meeting

September 8th, 2011

Agenda

- Project Background & Goals
- Inputs into Road Segment Alerting
  - Why is *Clarus* Data Important?
- About 511NY
- Demonstration Scenarios
- Observations and Results
- Next Steps
- Questions?

Project Background

- Project part of the Federal Highway Administration (FHWA) Broad Agency Announcement
  - Research on *Clarus* System Data
  - Winter/Spring 2010
  - Solicitation Number DTFH61-10-R-00015
- "…develop new or improved road weather management/operations procedures, create innovative user interfaces, and develop new applications including weather-responsive traffic management tools."

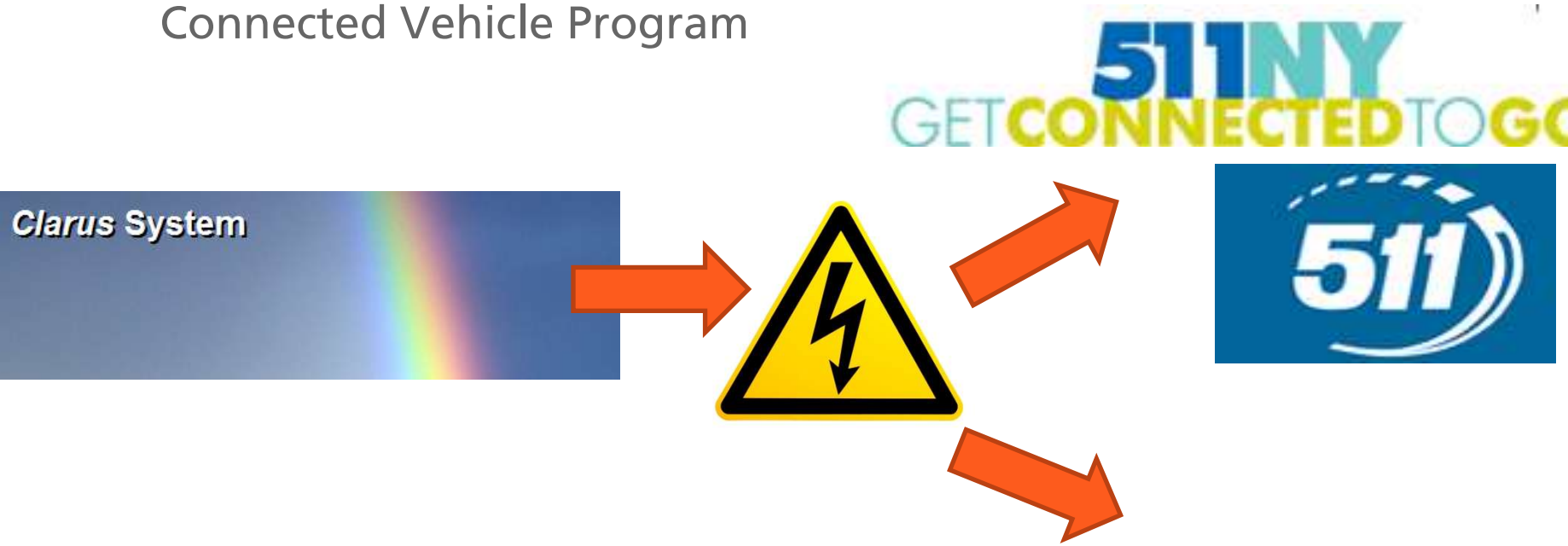
Additional Uses of *Clarus* Data continued

- Received 15 proposals, made 8 awards (5 academic, 3 private)
- Period of performance: 12 months, thru Sept. 2011

AMEC Americas Ltd.....	Add Nova Scotia & New Brunswick to *Clarus*
University of Idaho.....	Integrate *Clarus* data into Traffic Signal Sys. Ops.
GST Inc.....	Fuse *Clarus* data & MoPED Data for alerting & DST
University of Maryland.....	Integrate *Clarus* data into Regional Integrated Transportation Information System (RITIS)
Univ. of North Dakota.....	Validate quality of mobile wx data from state fleets: MN, ND & SD DOTs
Montana State Univ.....	Integrate *Clarus* data into Rural Travel Wx DST
Michigan Tech. Univ.....	Integrate *Clarus* data & Crash Data for travel DST
Telvent-NY Inc.....	Road Segment Alerts with *Clarus* data; NY 511

Project Goals

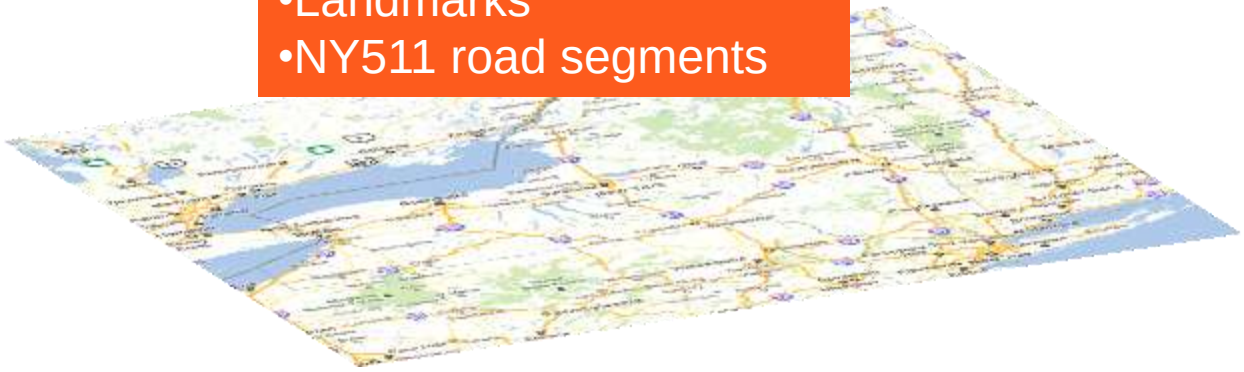
- Collect and integrate *Clarus* observations and disseminate road-segment alerts for use in the New York 511 system and Connected Vehicle Program



NYDOT Connected Vehicle Program

Road Segment Alerting Inputs

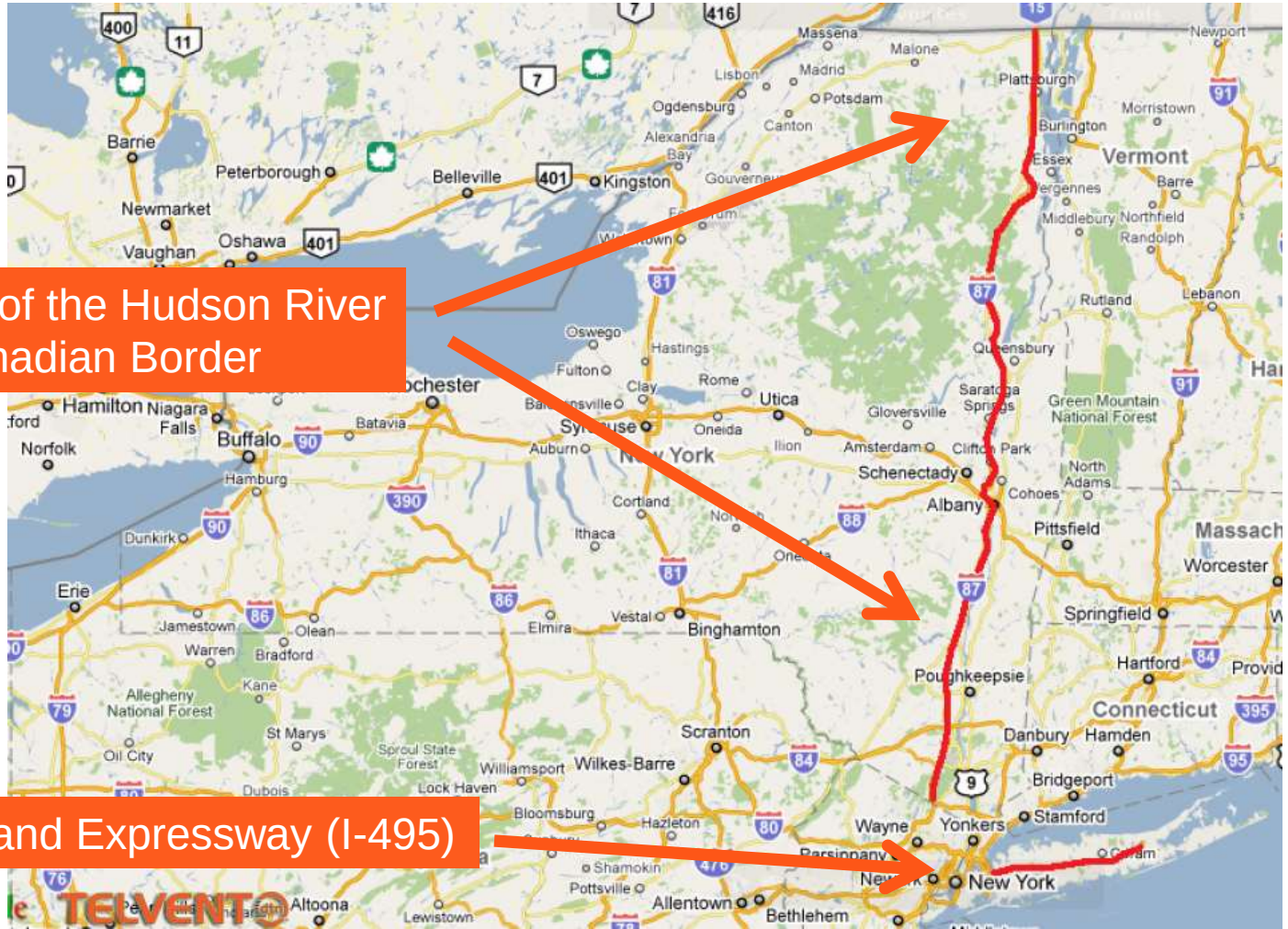
Defined by:
- Highway segments
- Landmarks
- NY511 road segments



Road Network

NYSDOT Road Network

- Project coverage – Two New York transportation corridors

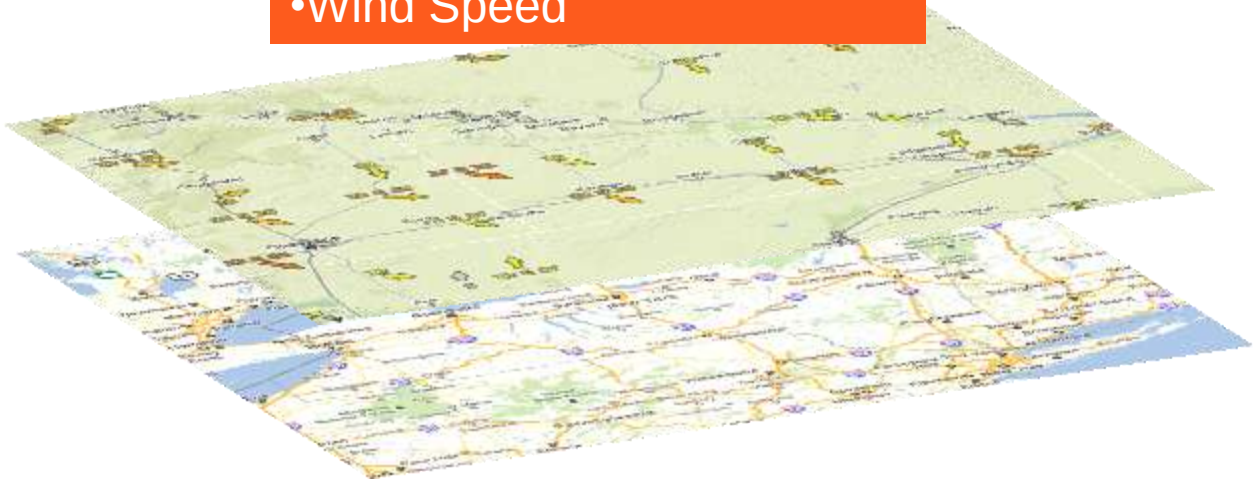


Road Segment Alerting Inputs

Atmospheric Observations
•Wind Speed

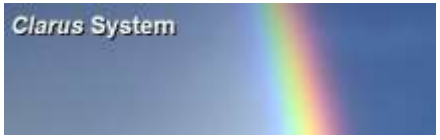
Observations

Road Network



Road Segment Alerting Inputs

NYSDOT RWIS from Clarus

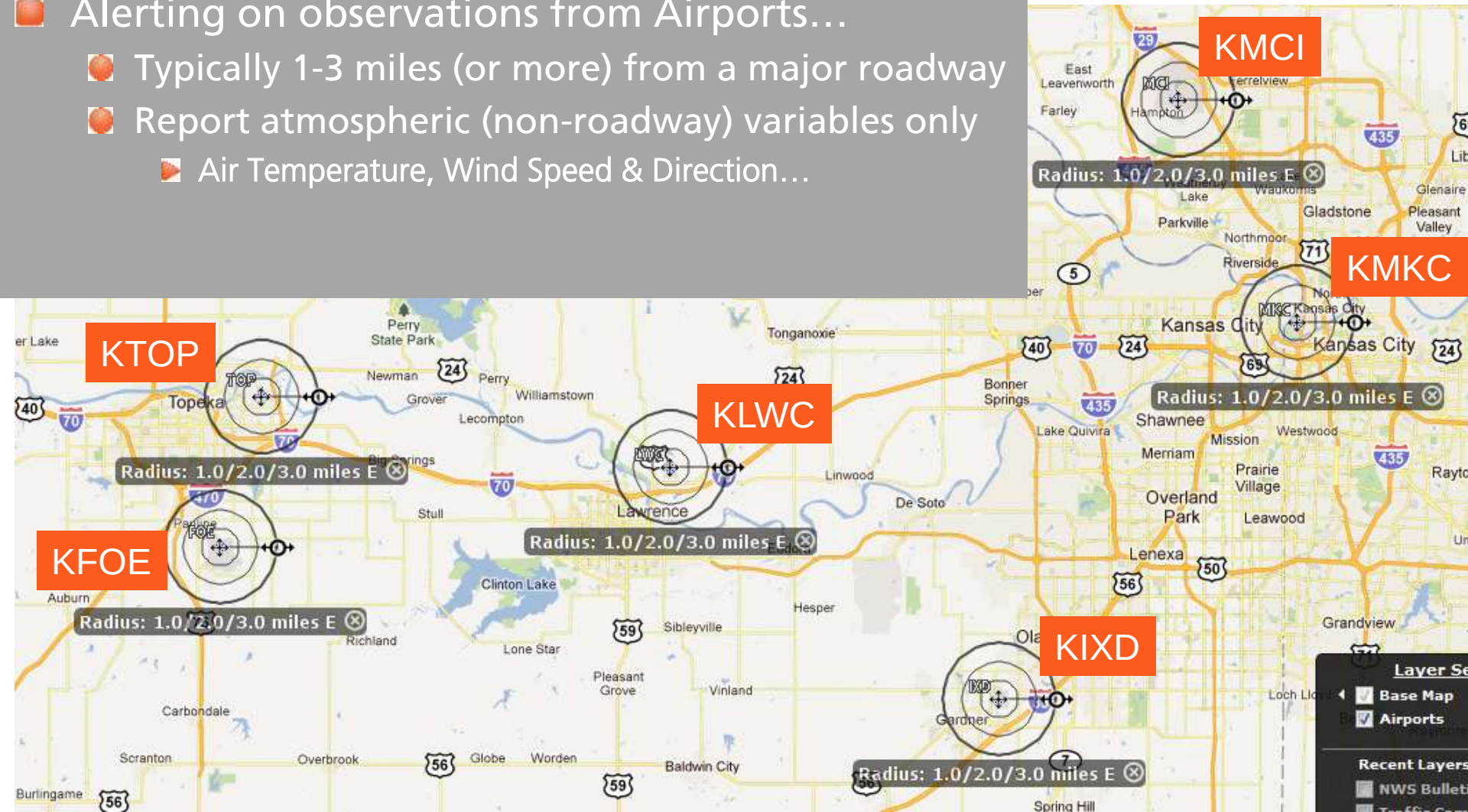


Observations

Road Network

Why is *Clarus* data valuable for Road Segment Alerting?

- Alerting on observations from Airports…
  - Typically 1-3 miles (or more) from a major roadway
  - Report atmospheric (non-roadway) variables only
    - Air Temperature, Wind Speed & Direction…



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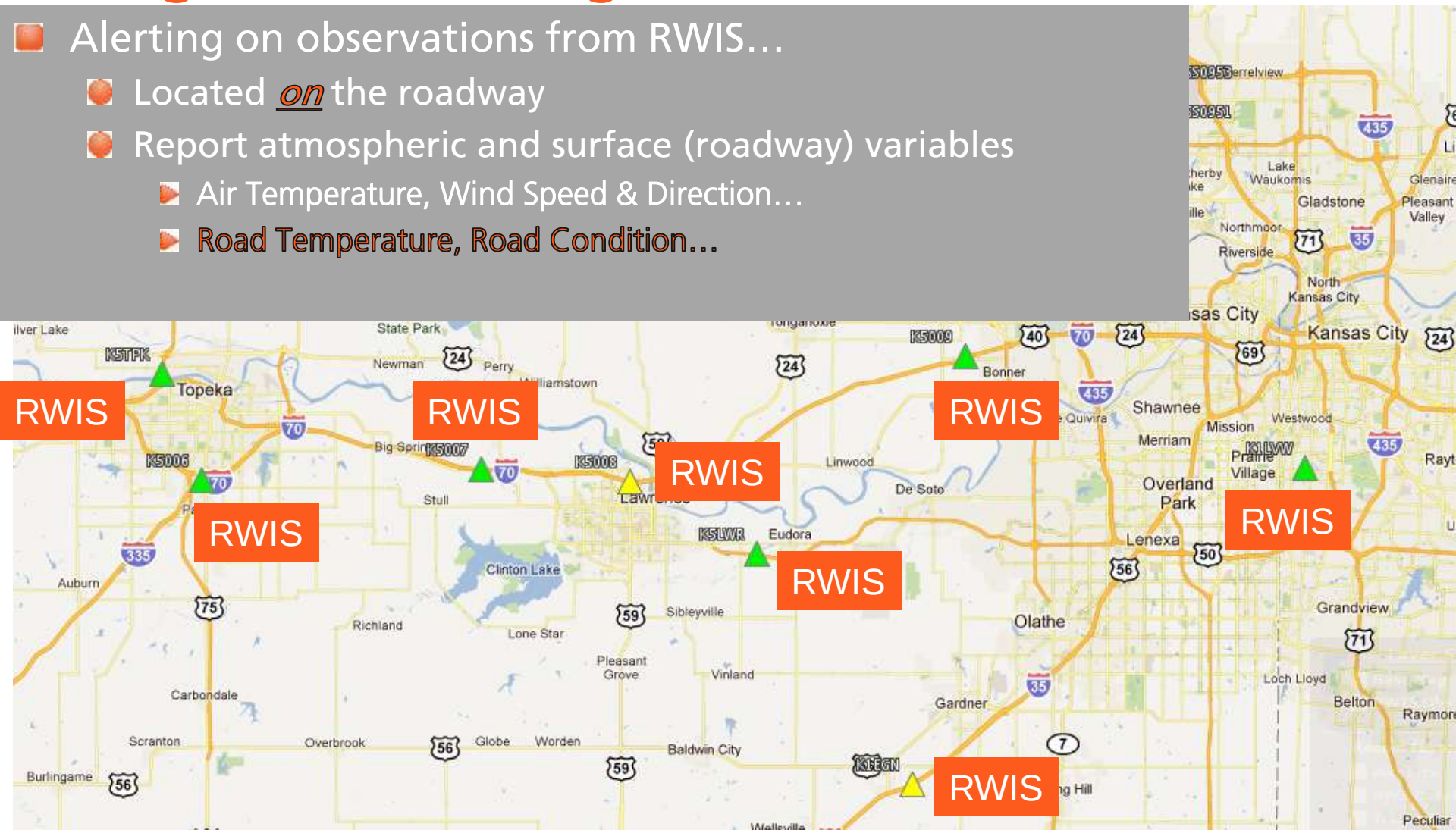
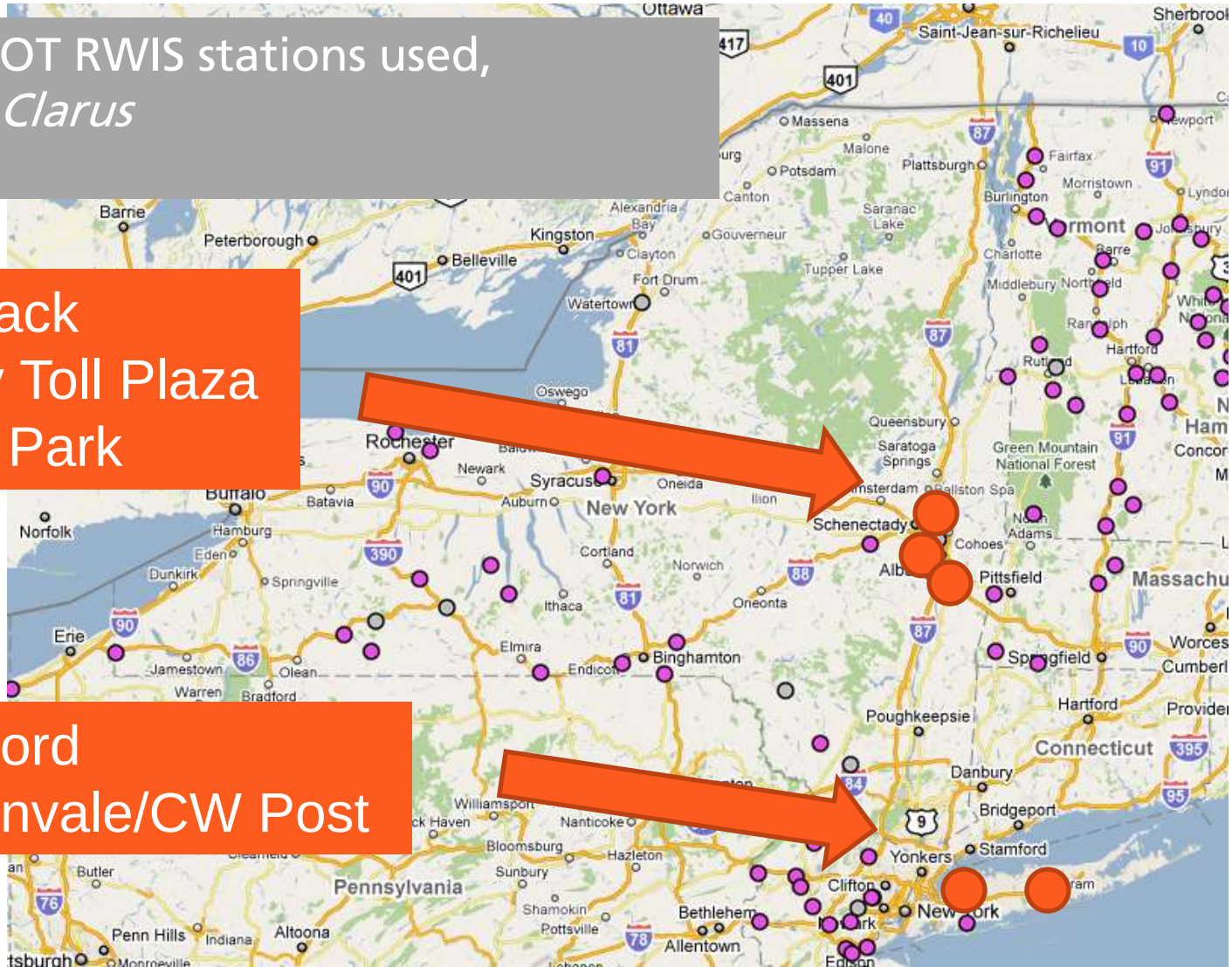
Why is *Clarus* data valuable for Road Segment Alerting?

- Alerting on observations from RWIS…
  - Located ***on*** the roadway
  - Report atmospheric and surface (roadway) variables
    - Air Temperature, Wind Speed & Direction…
    - Road Temperature, Road Condition…



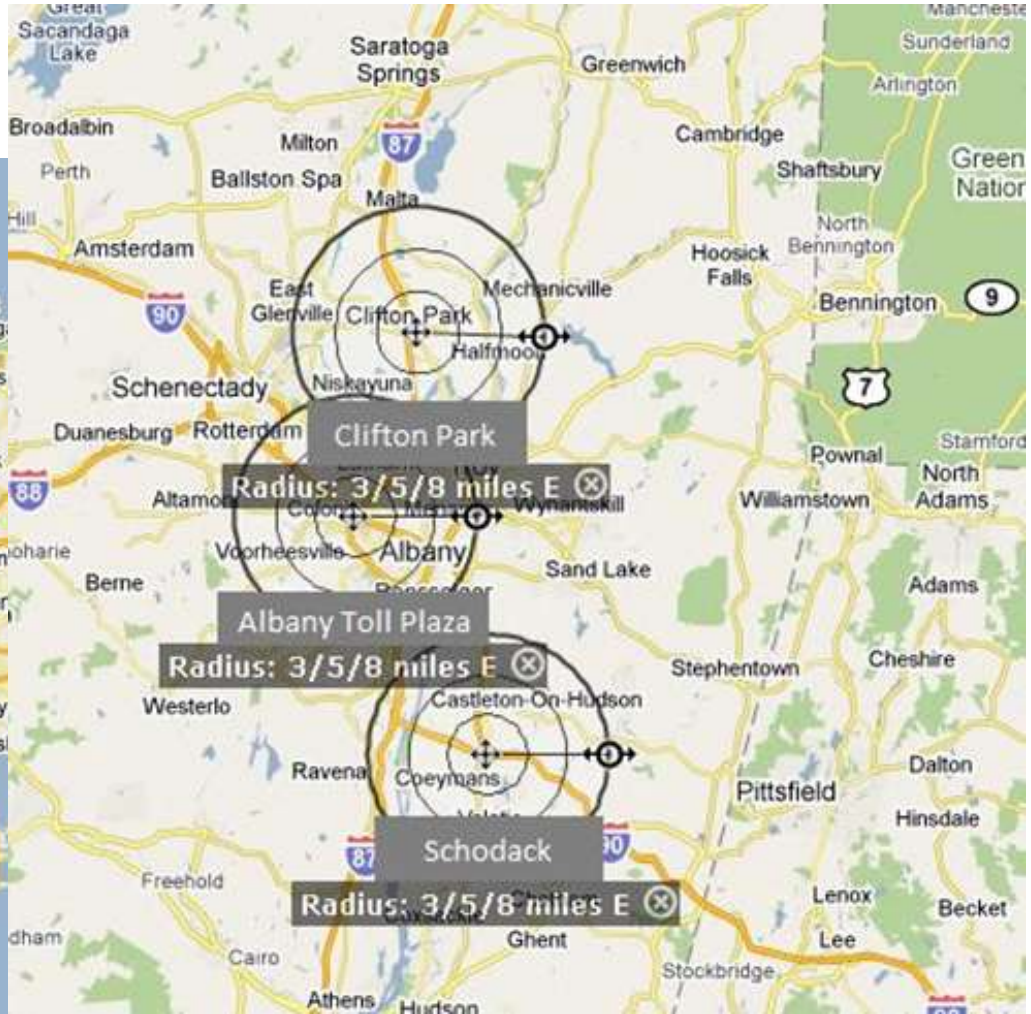
Clarus Stations Used

- Five (5) NYSDOT RWIS stations used, delivered via *Clarus*



Clarus RWIS versus Roadway

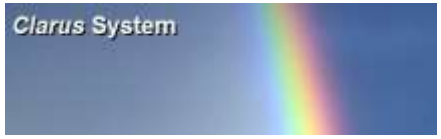
- Radius of influence around the RWIS selected from *Clarus*
  - 8 miles



Road Segment Alerting Inputs

Radar

- Intensity (Light, Moderate, Heavy)
- Type (Rain, Snow, Mix)



Observations

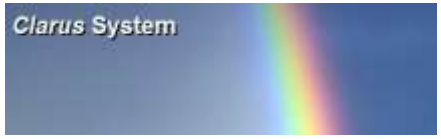
Road Network

Road Segment Alerting Inputs

- Winter Storm Warning
- Blizzard Warning
- Tornado Warning

NWS Warnings

Radar



Observations

Road Network

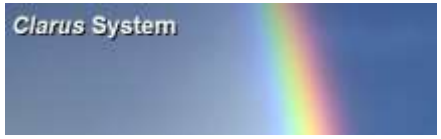
Road Segment Alerting Inputs

- Storm "cat-scan"
  - Rotation (tornados)
  - Hail potential

Storm Corridors

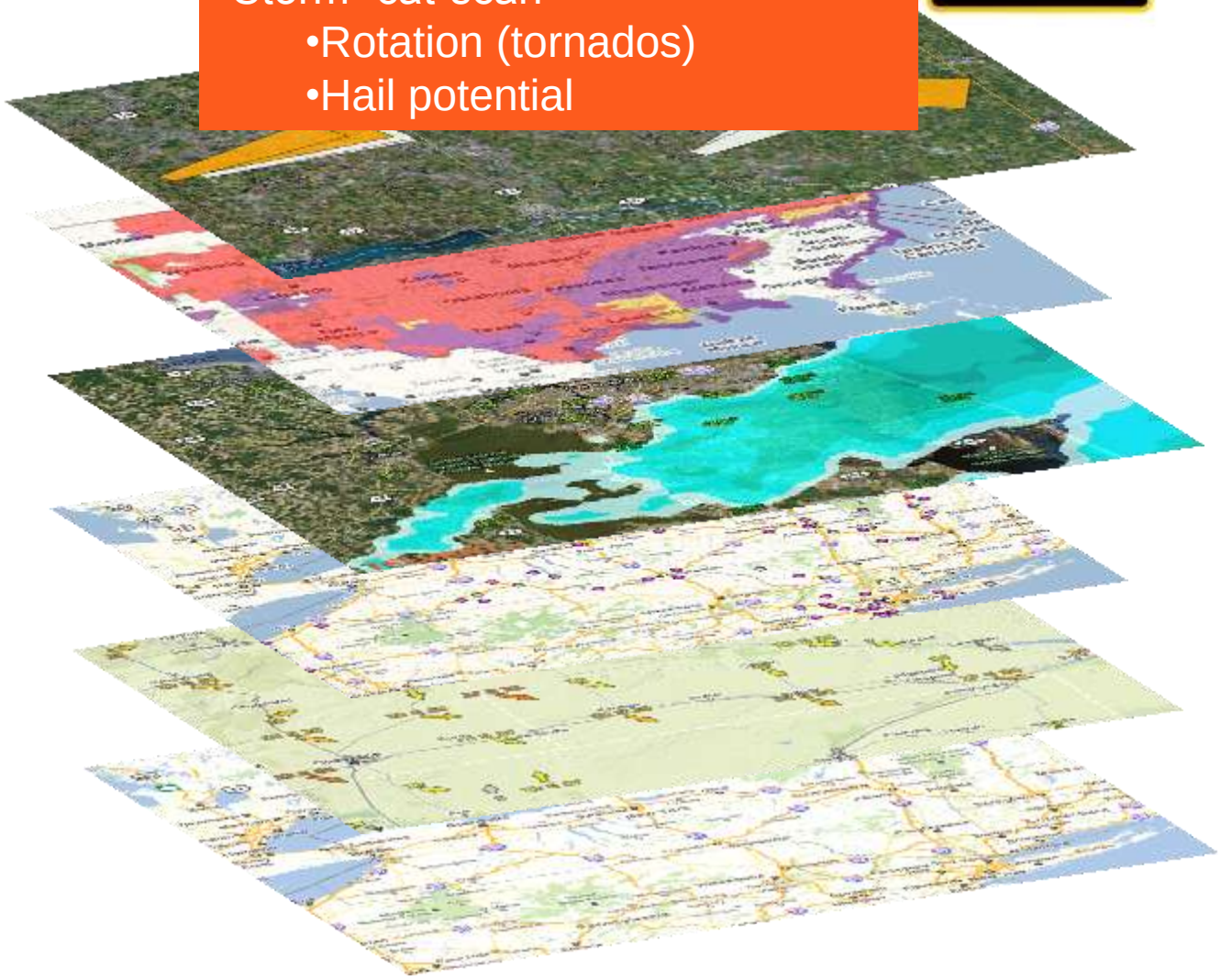
NWS Warnings

Radar



Observations

Road Network

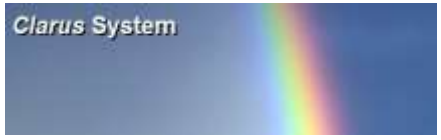


Road Segment Alerting Inputs

Storm Corridors — Which storms have a potential tornado? Where is it moving?

NWS Warnings — Where are Blizzard Warnings posted?

Radar — Where is heavy snow falling?



Where are pavements observed to be wet? Below freezing?

Observations — Where is it extremely windy right now?

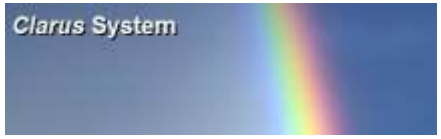
Road Network — Which specific road segment is having issues?

Road Segment Alerting Inputs

Storm Corridors

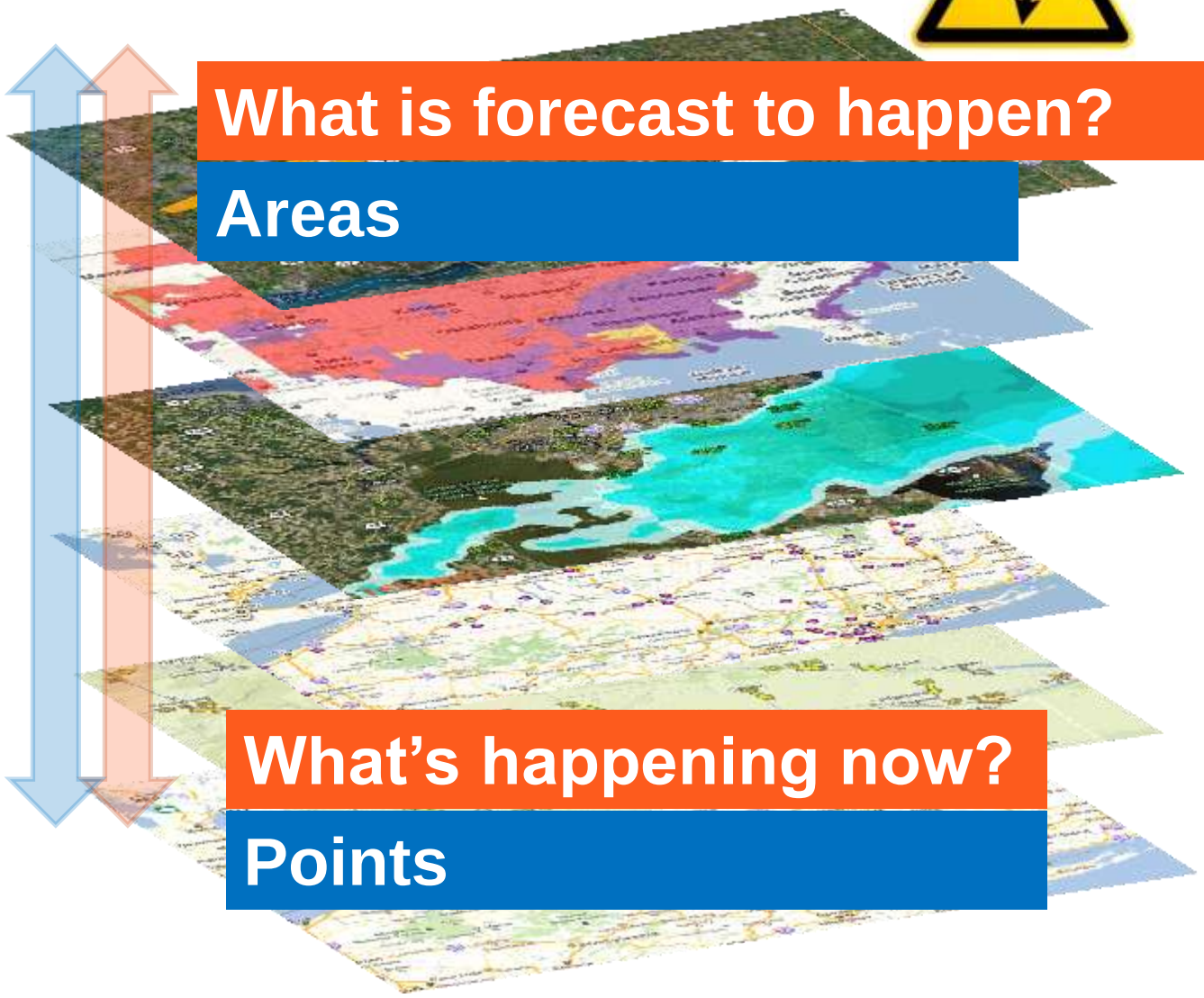
NWS Warnings

Radar



Observations

Road Network



What is forecast to happen?

Areas

What's happening now?

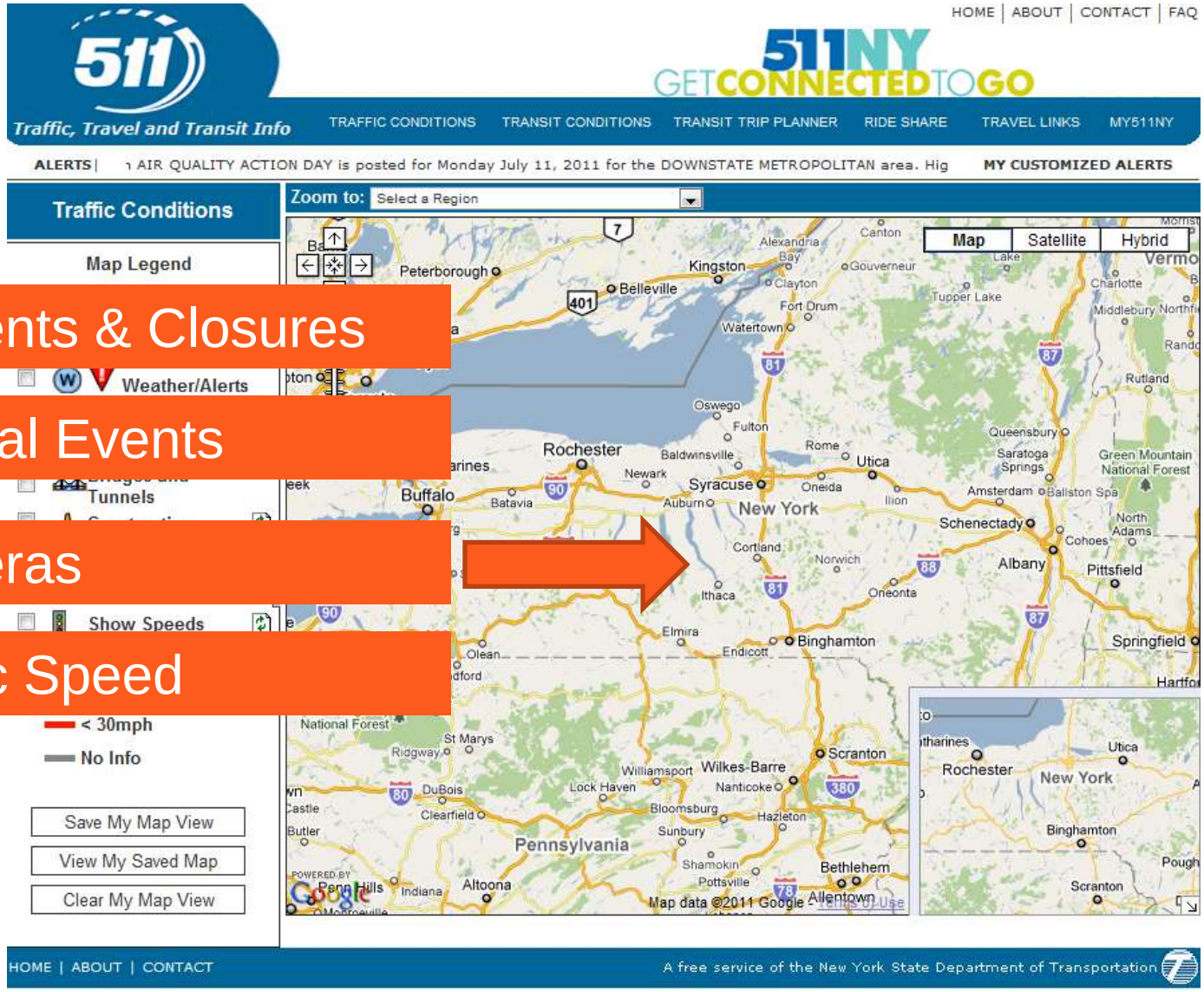
Points

Architecture & End Users

About 511NY

www.511ny.org

About 511NY



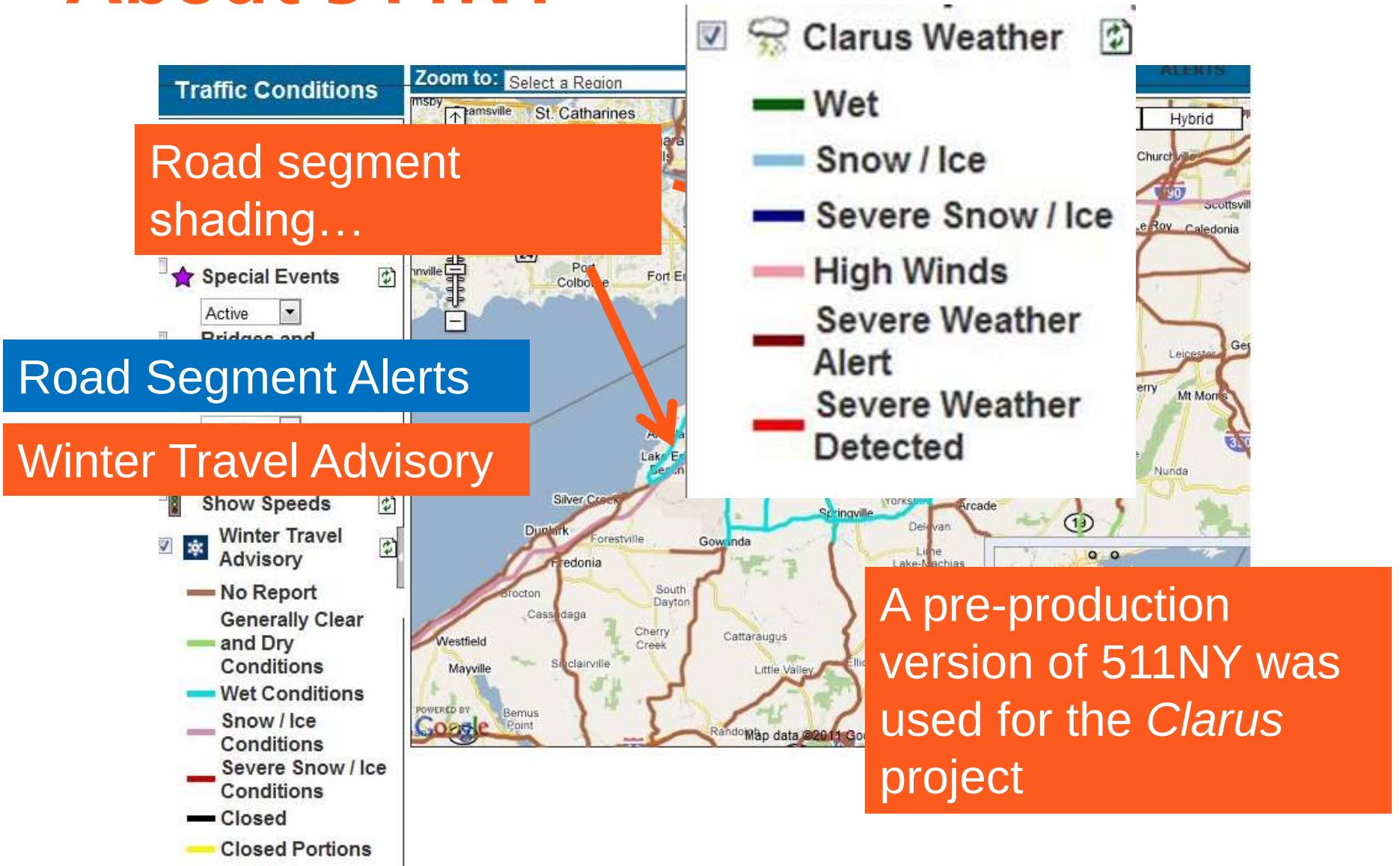
Incidents & Closures

Special Events

Cameras

Traffic Speed

About 511NY

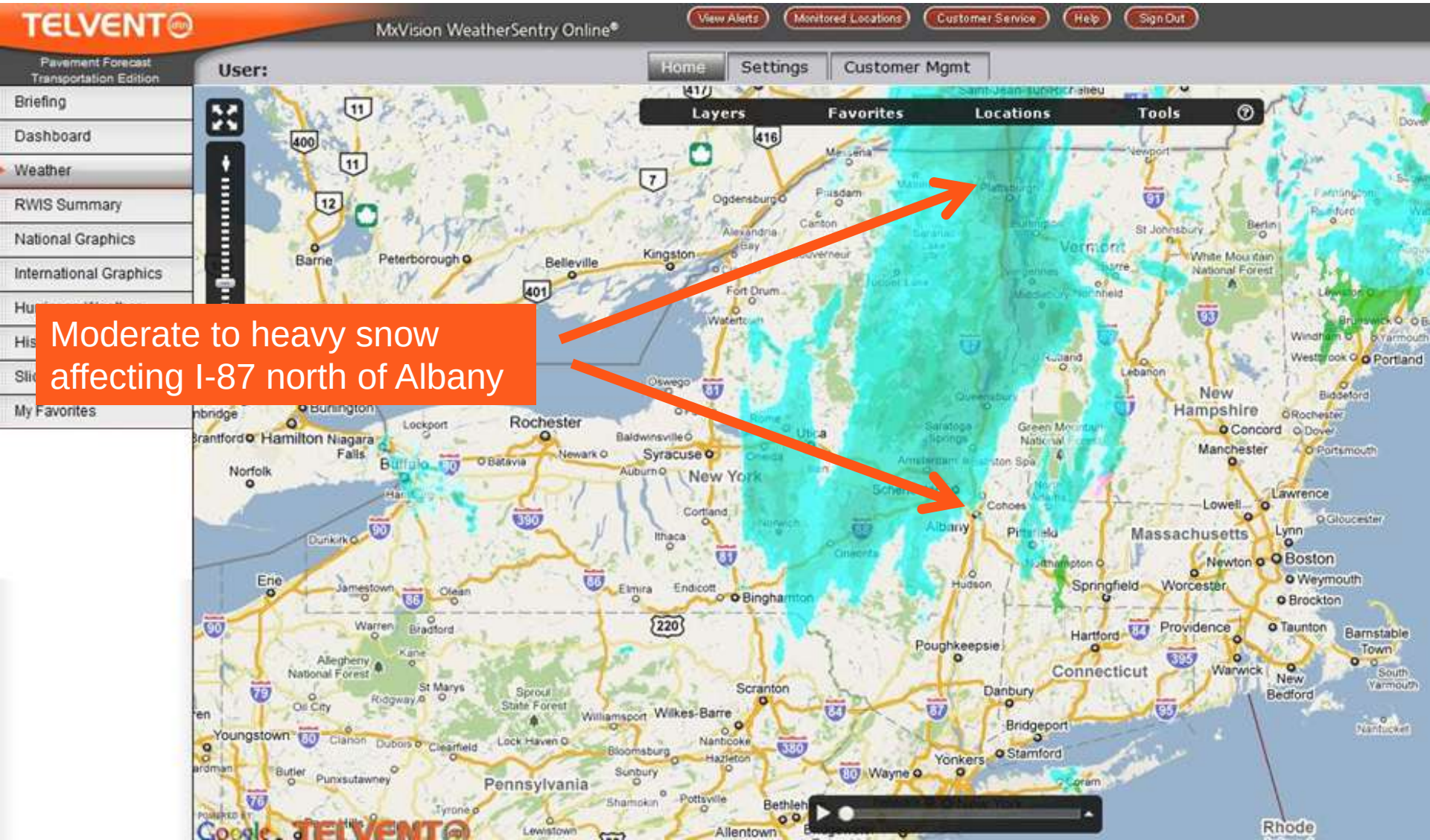


A pre-production version of 511NY was used for the *Clarus* project

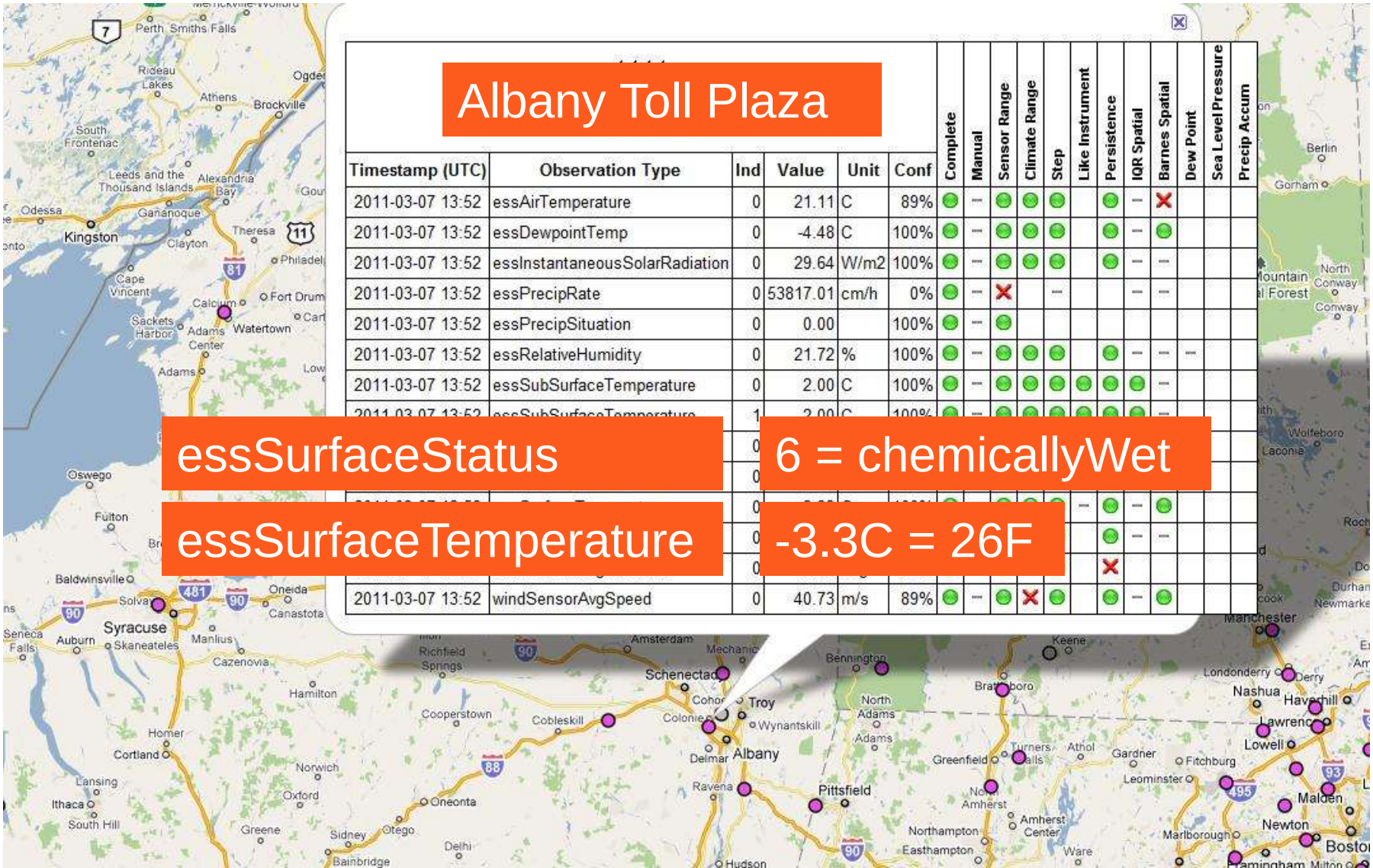
Two Demonstration Scenarios

- March 7th, 2011
  - Snow storm
- April 28th, 2011
  - Severe weather outbreak

Scenario #1 – March 7th, 2011

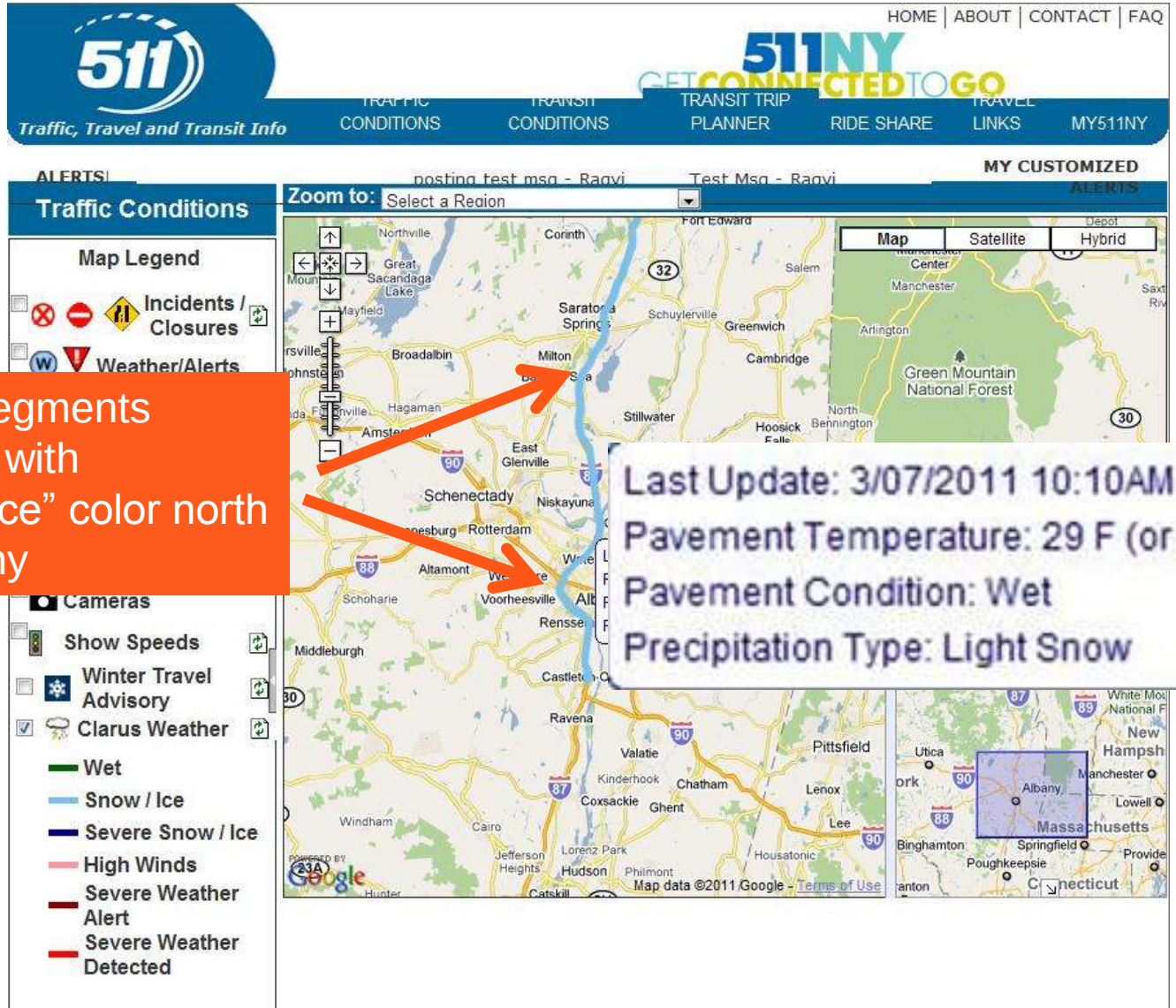


Scenario #1 – March 7th, 2011



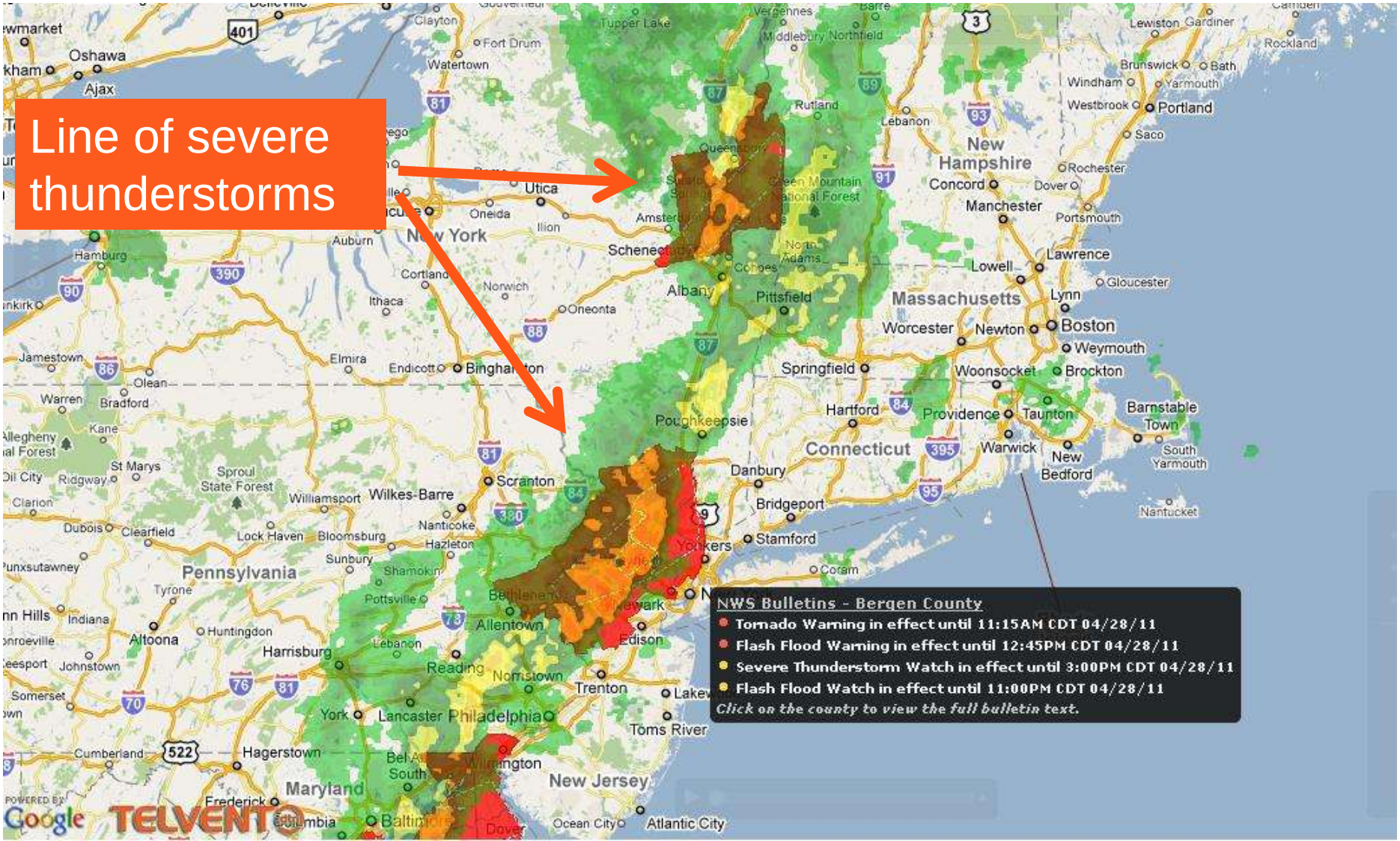
Timestamp (UTC)	Observation Type	Ind	Value	Unit	Conf	Complete	Manual	Sensor Range	Climate Range	Step	Like Instrument	Persistence	IQR Spatial	Barnes Spatial	Dew Point	Sea Level Pressure	Precip Accum
2011-03-07 13:52	essAirTemperature	0	21.11	C	89%	●	–	●	●	●		●	–	✗			
2011-03-07 13:52	essDewpointTemp	0	-4.48	C	100%	●	–	●	●	●		●	–	●			
2011-03-07 13:52	essInstantaneousSolarRadiation	0	29.64	W/m2	100%	●	–	●	●	●		●	–	–			
2011-03-07 13:52	essPrecipRate	0	53817.01	cm/h	0%	●	–	✗		–			–	–			
2011-03-07 13:52	essPrecipSituation	0	0.00		100%	●	–	●									
2011-03-07 13:52	essRelativeHumidity	0	21.72	%	100%	●	–	●	●	●		●	–	–	–		
2011-03-07 13:52	essSubSurfaceTemperature	0	2.00	C	100%	●	–	●	●	●	●	●	●	–			
2011-03-07 13:52	windSensorAvgSpeed	0	40.73	m/s	89%	●	–	●	✗	●		●	–	●			

Scenario #1 – March 7th, 2011

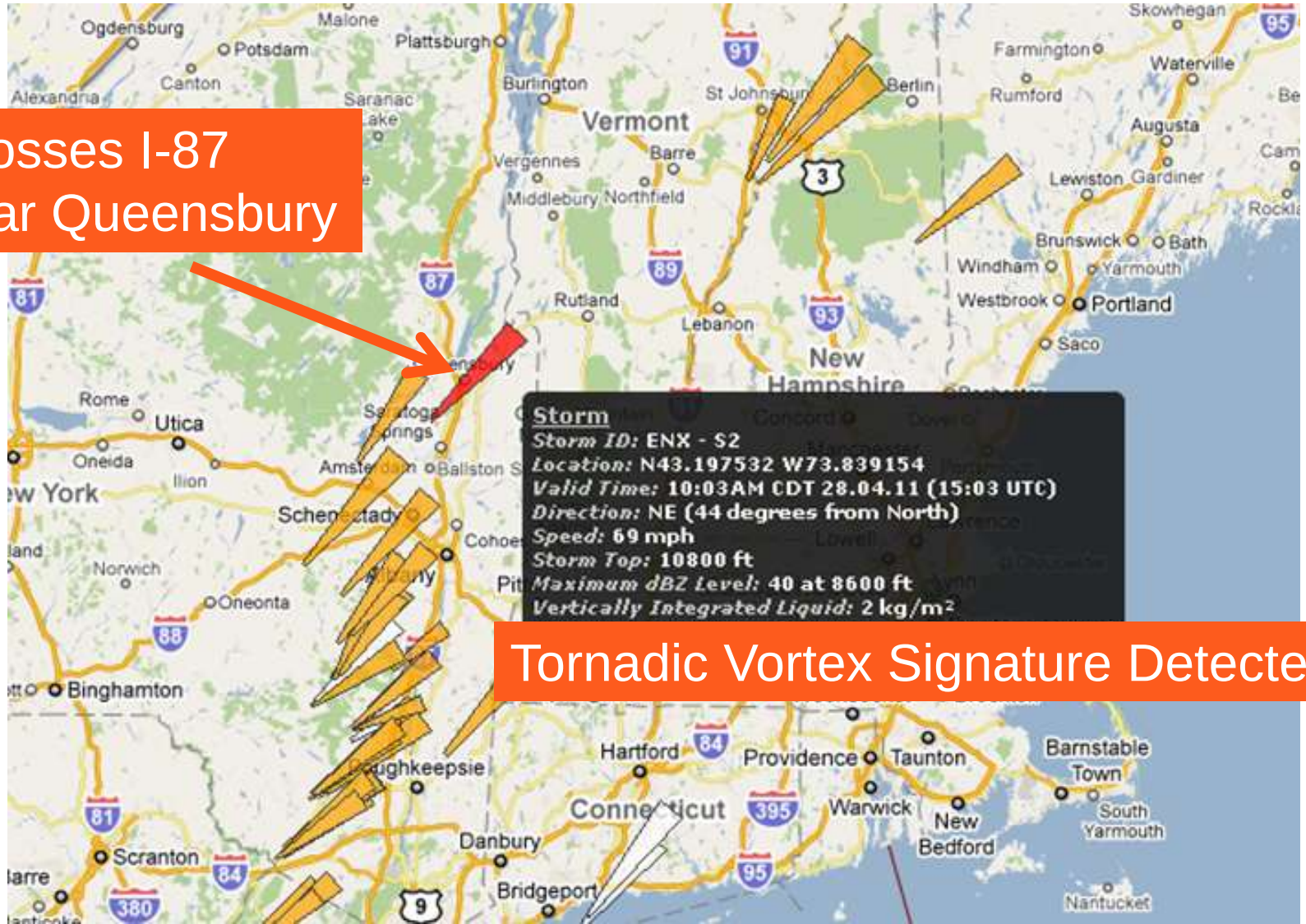


Road segments shaded with "Snow/Ice" color north of Albany

Scenario #2 – April 28th, 2011

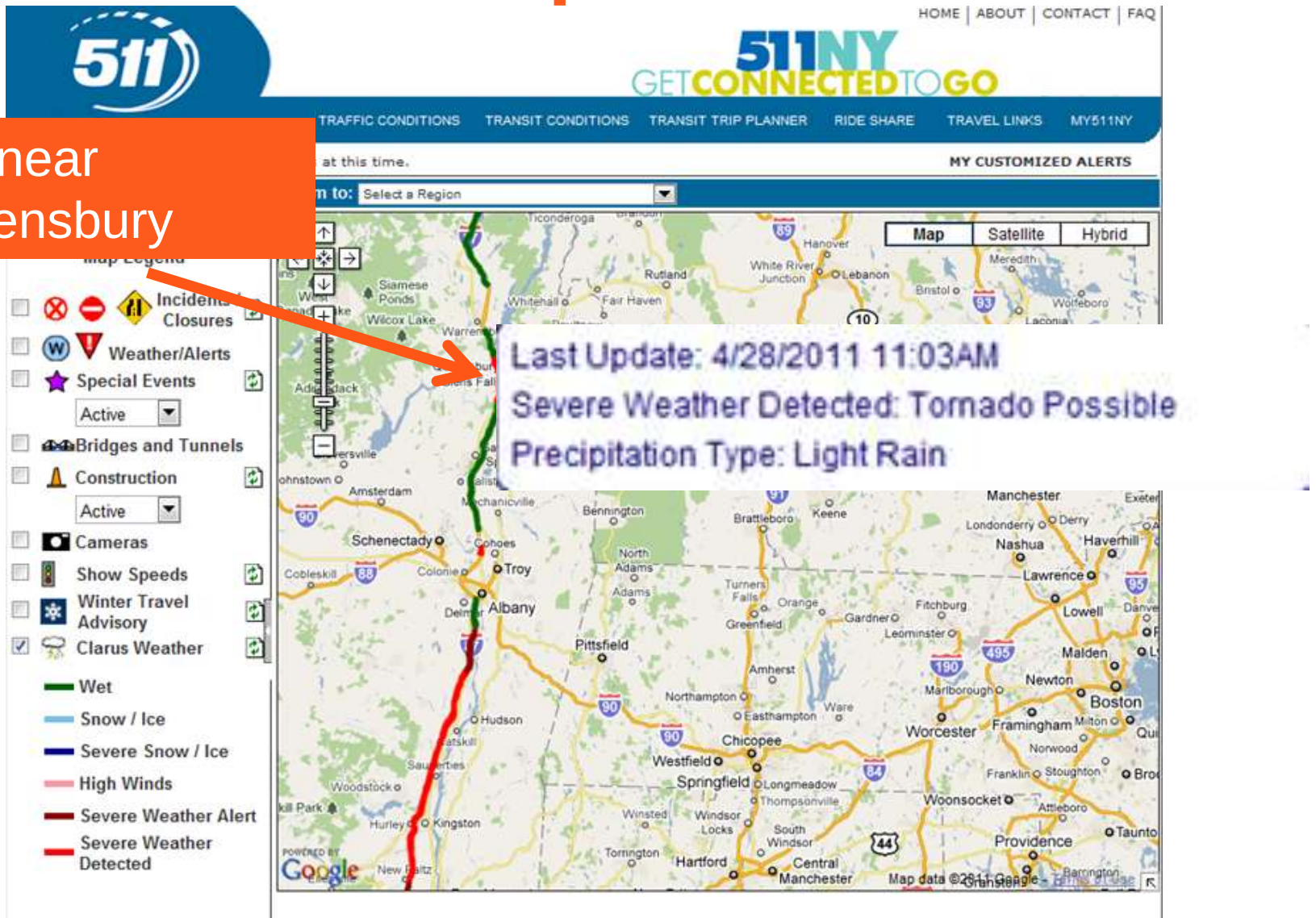


Scenario #2 – April 28th, 2011



Scenario #2 – April 28th, 2011

I-87 near Queensbury



From the Traveler's Perspective

- End user = **Travelling Public**
  - Brings information down to the roadway level (*Clarus* & RWIS)
  - Insight into weather in-between sensors
  - Insight into developing weather situations that will affect the region

From the Traveler's Perspective

"I see nothing falling from the sky but is the road slick?"

"Which portion of my route is or will be affected by high winds?"

"It is sunny now. Am I about to drive into a developing blizzard?"

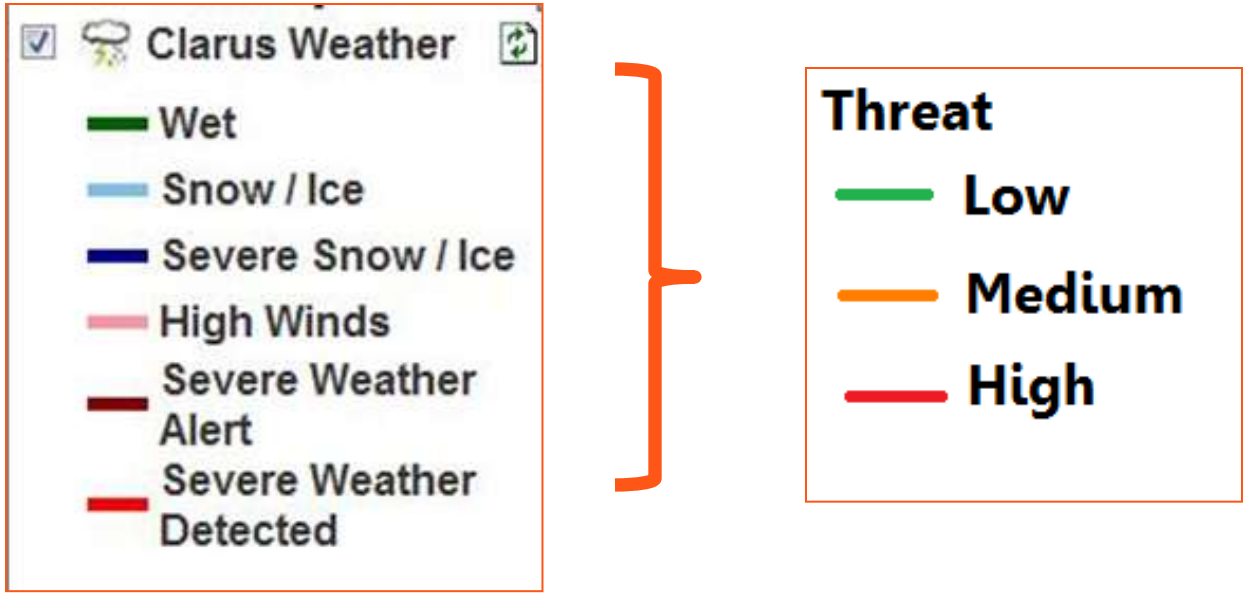
"I see where the severe weather is now. Which roads will it affect in the next 15-30 minutes?"

Observations & Results

- Both NYSDOT and FHWA evaluated the pre-production 511NY system over a 3-month time period.
  - Alert Prioritization
    - Standardize order of alerts to display (radar versus warnings, etc.)
  - Data Quality
    - RWIS data quality is key to ensure data can be utilized for alerting
  - Information Clarity
    - Keep public perception/interpretation in mind…keep it simple
    - Provide additional information on alert types
    - Standardize the colorization and terminology
    - Cease use of Flood Warnings…keep Flash Flood Warnings
  - **Thank you NYSDOT & FHWA!**

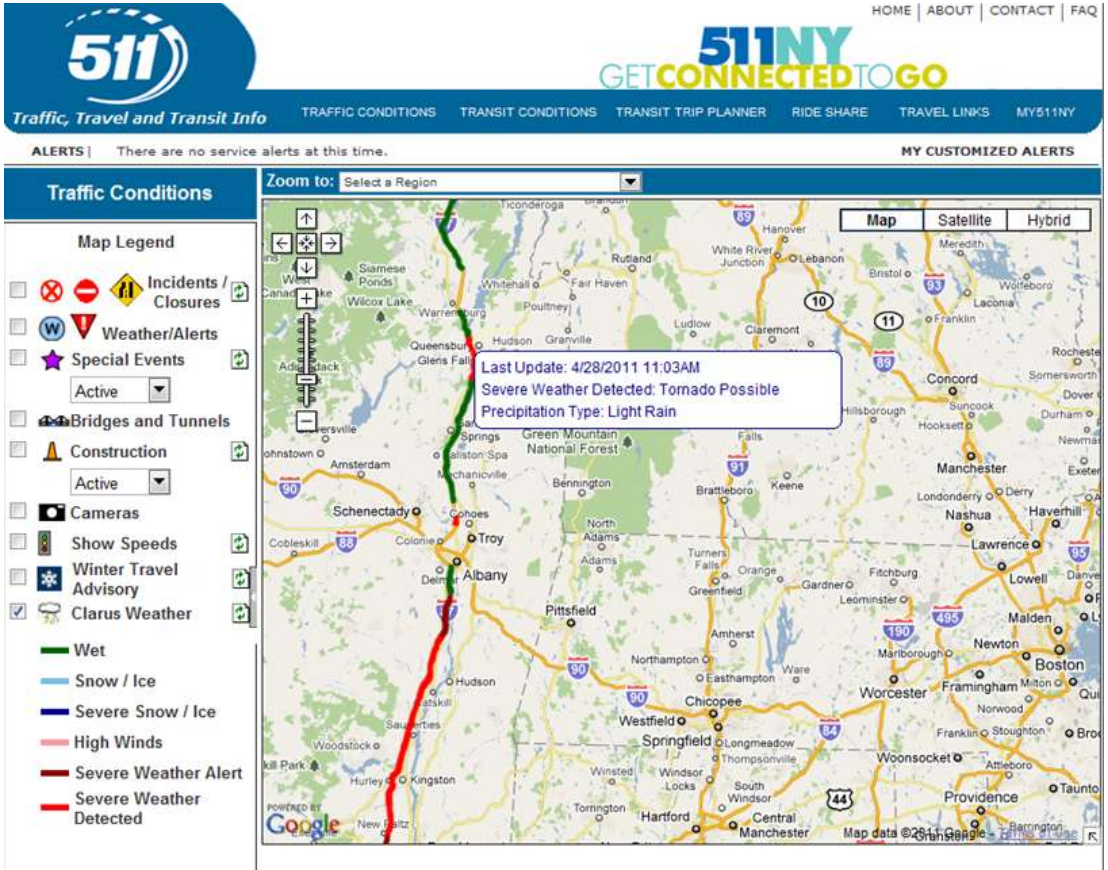
Next Steps

- Simplify and clarify the alert results



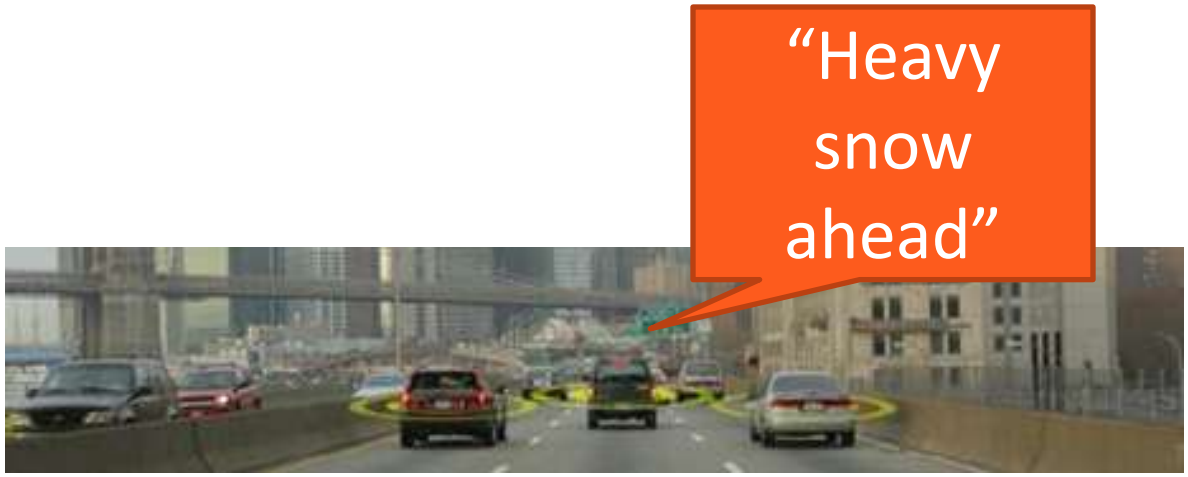
Next Steps

- Simplify and clarify the alert results
- Explore integration of road segment alerts into 511NY production system



Next Steps

- Simplify and clarify the alert results
- Explore integration of road segment alerts into 511NY production system
- Integrate road segment alerts into the NY Connected Vehicle program



Other Uses for Road Segment Alerting

- XML feed can be integrated into many different applications
  - Connected vehicle initiatives
  - 511 programs
  - Traffic Management Centers
  - Traffic modeling input
  - Signal timing

Questions?

- Final Report
  - www.its.dot.gov/index.htm
  - Integrating *Clarus* Data with the 511 New York Traveler Information System
  - FHWA Publication Number: FHWA-JPO-11-112

Thank You