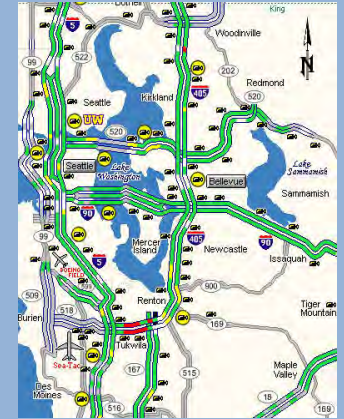


Connected Vehicles and Weather – The Vehicle Data Translator (VDT)



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U.S. Department of Transportation
Federal Highway Administration

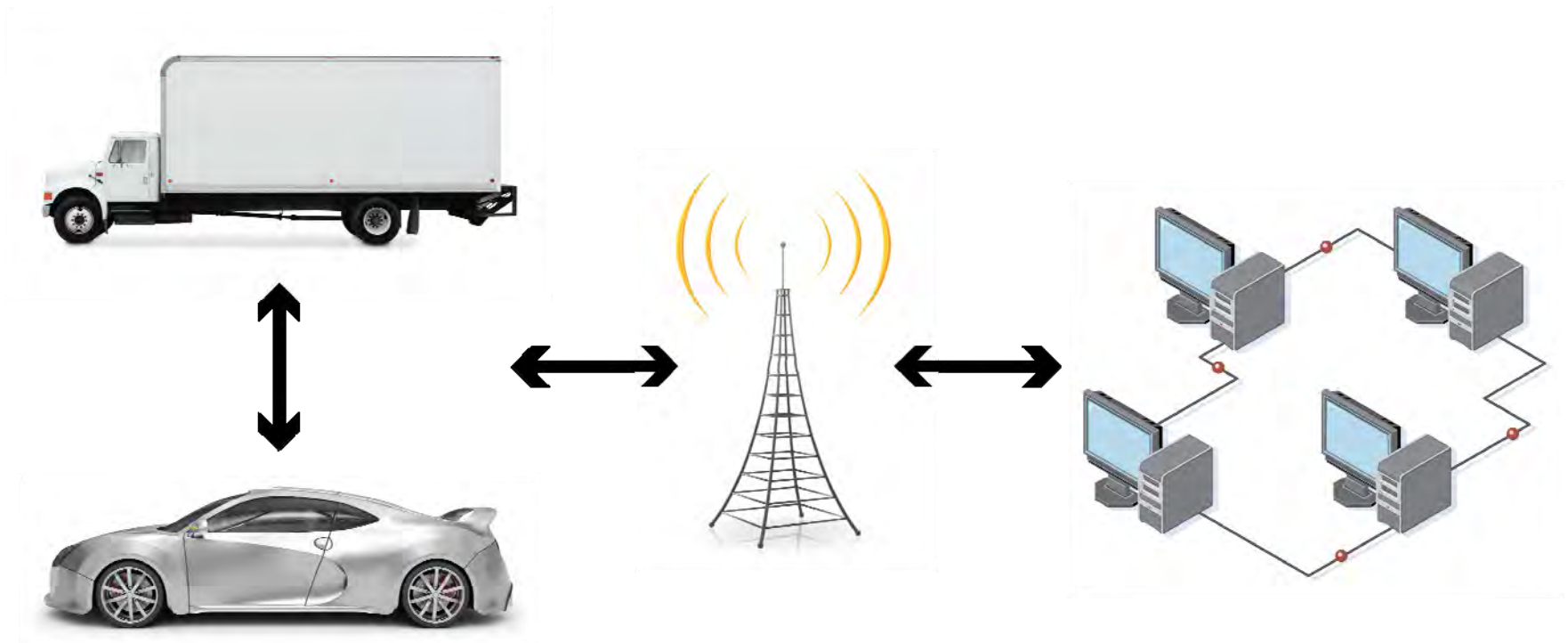
Vehicle Data Translator (VDT)



FHWA Road Weather Objectives

- **Develop and improve the Connected Vehicles' role in "Anytime, Anywhere Road Weather Information"**
- **Better Characterization of current weather and road-weather conditions**
- **Accurate Quality Checking and/or Quality Control of vehicle data**
- **Development of inferred road segment specific weather and road-weather information for end-user applications**

Vehicle Data Translator (VDT)



Originally targeted for crash avoidance, automatic tolling, etc.

Vehicle Data Translator (VDT)



Stage 1: Simple Quality Checking (QCh)

Is the observation reasonable in place and time?

Stage 2: More sophisticated QCh and organization of obs

- Observations QCh'd versus fixed weather stations and other vehicles
- Observations organized by grid cell and road segment
- Segment and grid cell statistics calculated (ex. average air temperature, number of ABS activations, etc.)

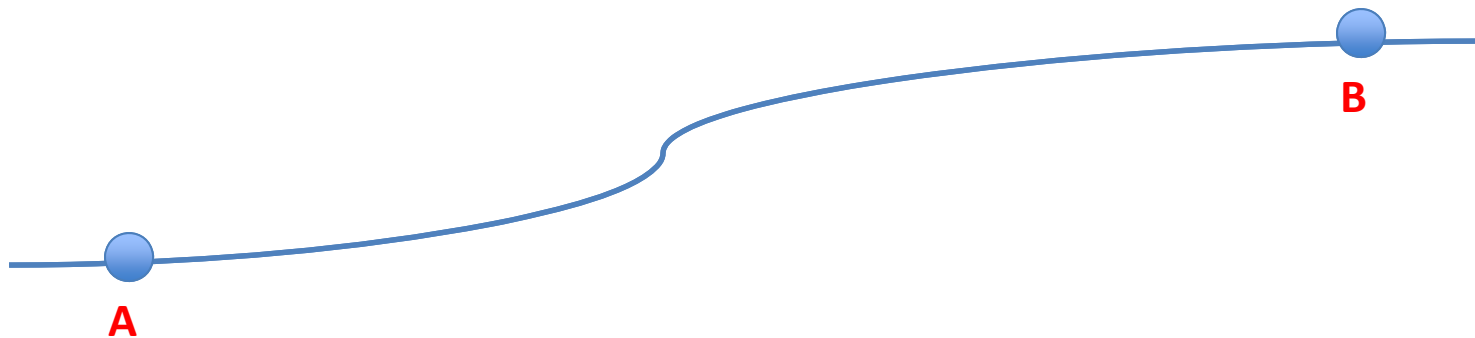
Stage 3: Road impact inferences are made...

- Is the road slick?
- Is visibility low?
- Is it raining or snowing?

Vehicle Data Translator (VDT)



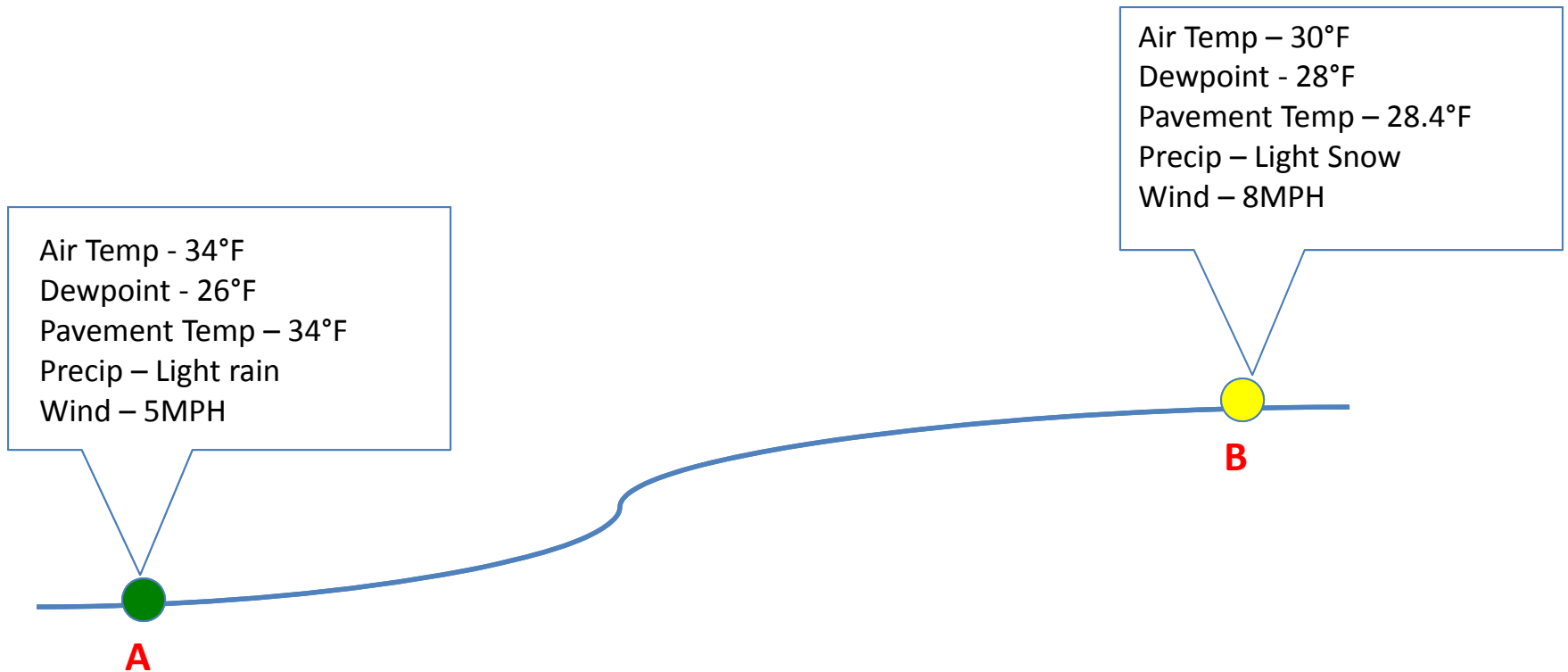
Current MDSS and Road Weather capabilities –
Fixed forecasts at RWIS locations



Vehicle Data Translator (VDT)



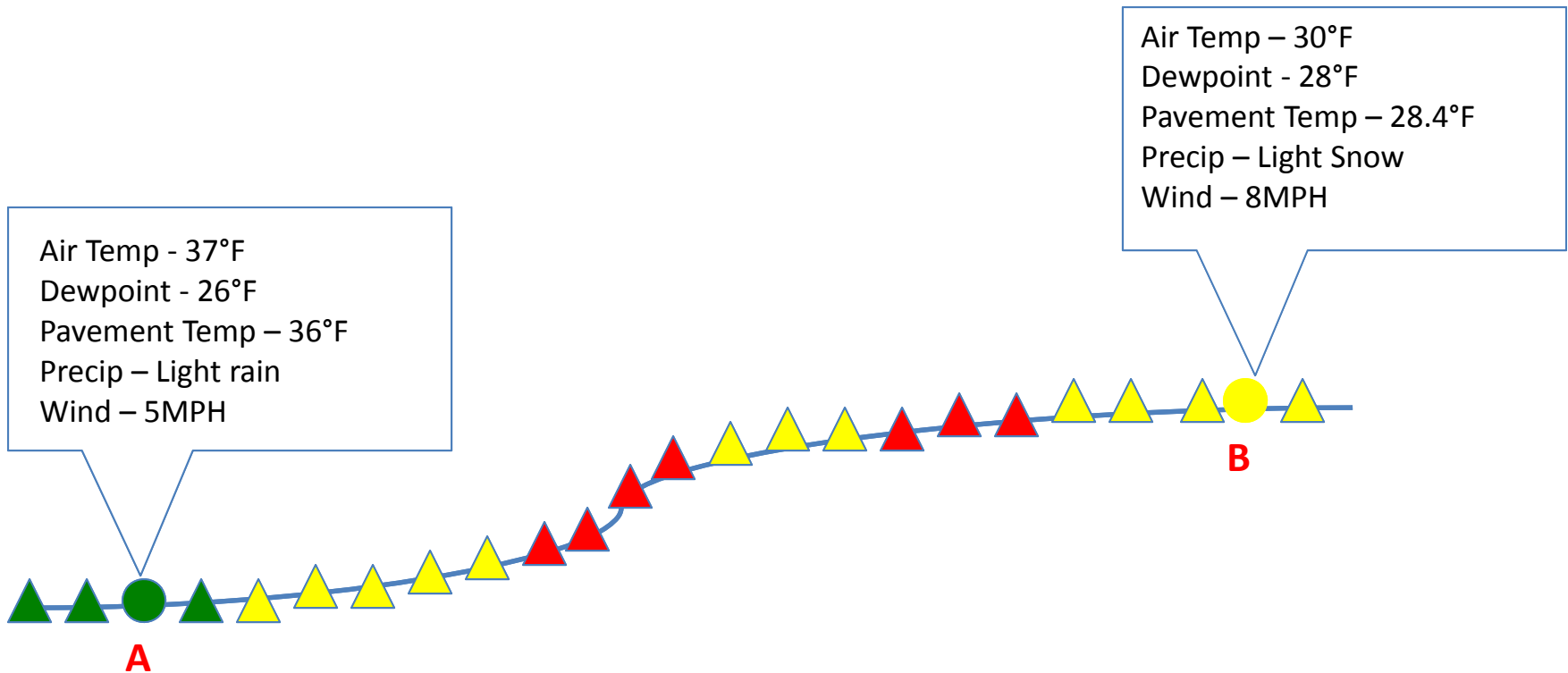
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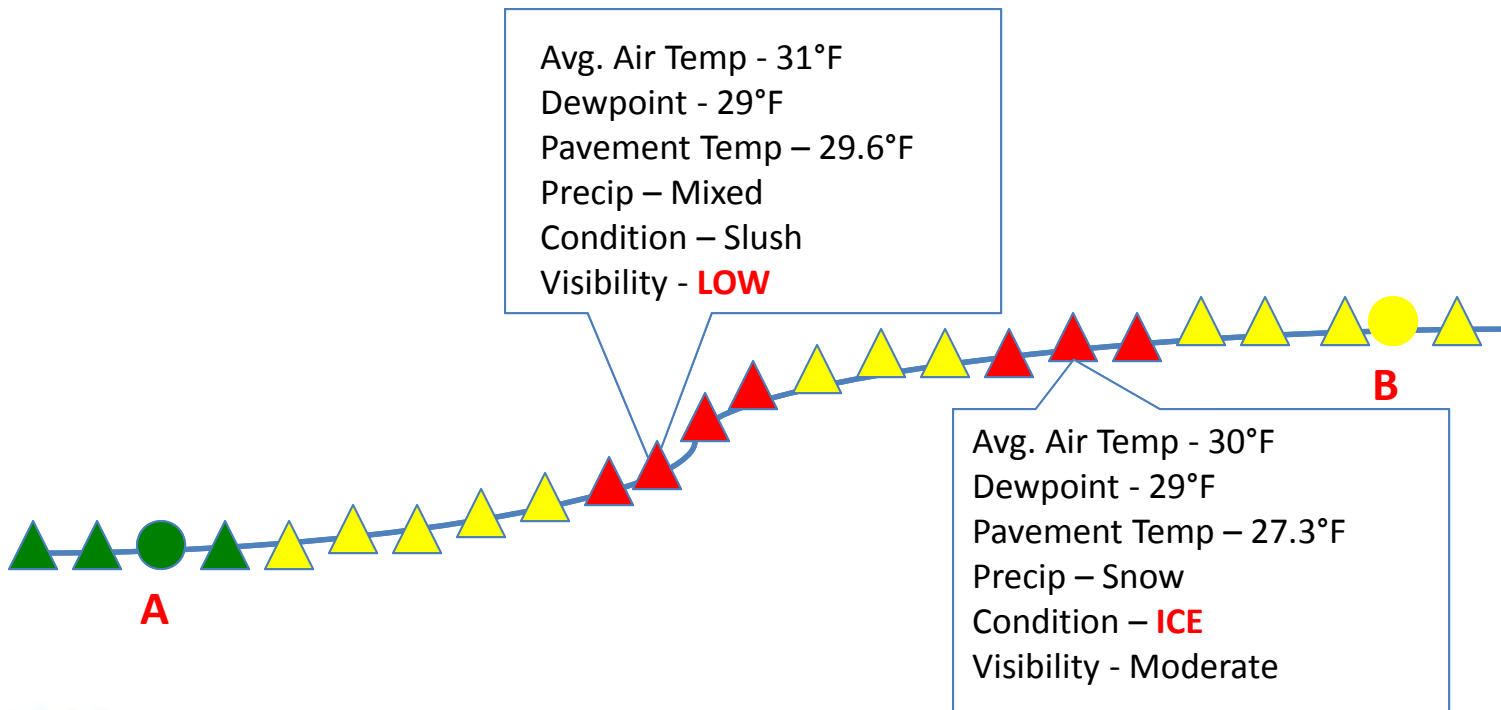
New MDSS and Road Weather capabilities – Segment by segment road weather information



Vehicle Data Translator (VDT)



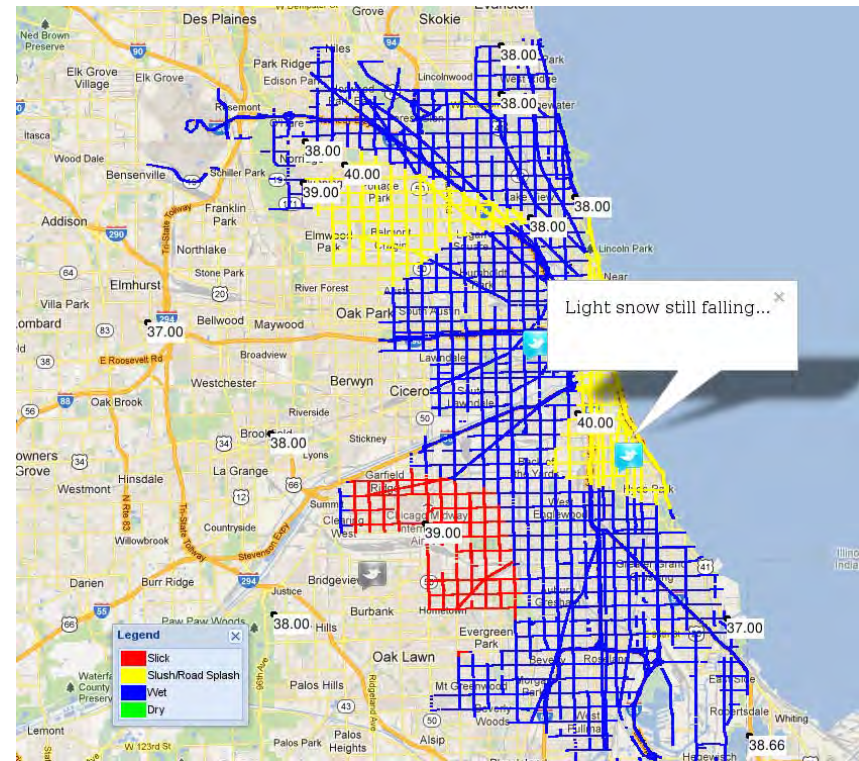
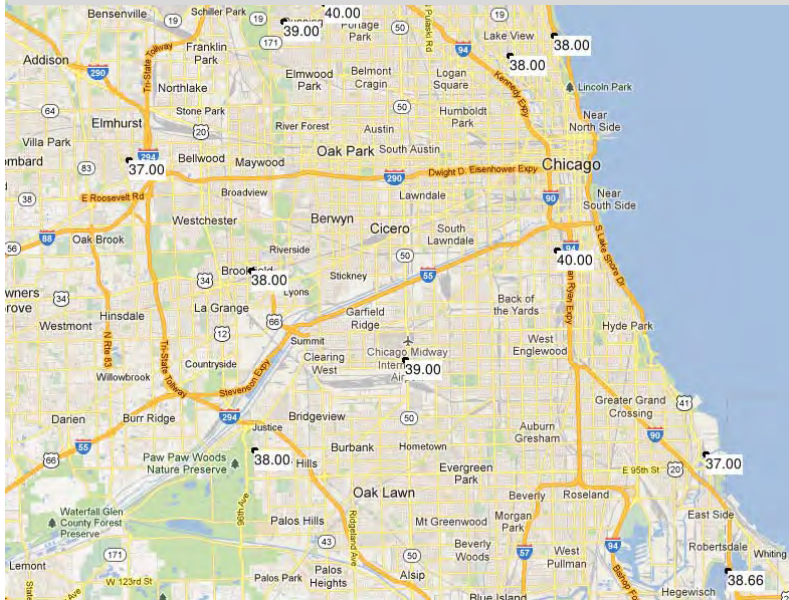
New MDSS and Road Weather capabilities –
Segment by segment road weather information



Vehicle Data Translator (VDT)



Today A 60% chance of snow, mainly afternoon. Sunny early, then becoming cloudy.



Goal: A system that will output road weather impact diagnostic for every major road segment in the United States

Current Research



Current USDOT Road Weather research is focused on pushing connected vehicle and VDT output to several possible DOT (and non-DOT) applications including:

- ❖ MDSS (Winter Maintenance)
- ❖ MODSS (Non-winter Maintenance)
- ❖ MMS (Asset Management)
- ❖ Traveler Information (511, TOC, Traveling Public)
- ❖ Freight (Enhanced Weather Info, Routing?, Parking?)
- ❖ EMS (Tactical and Strategic Weather during Incidents)

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- ❖ EMS (Tactical and Strategic Weather during Incidents)
- ❖ School Buses and Public Transportation

Current Research



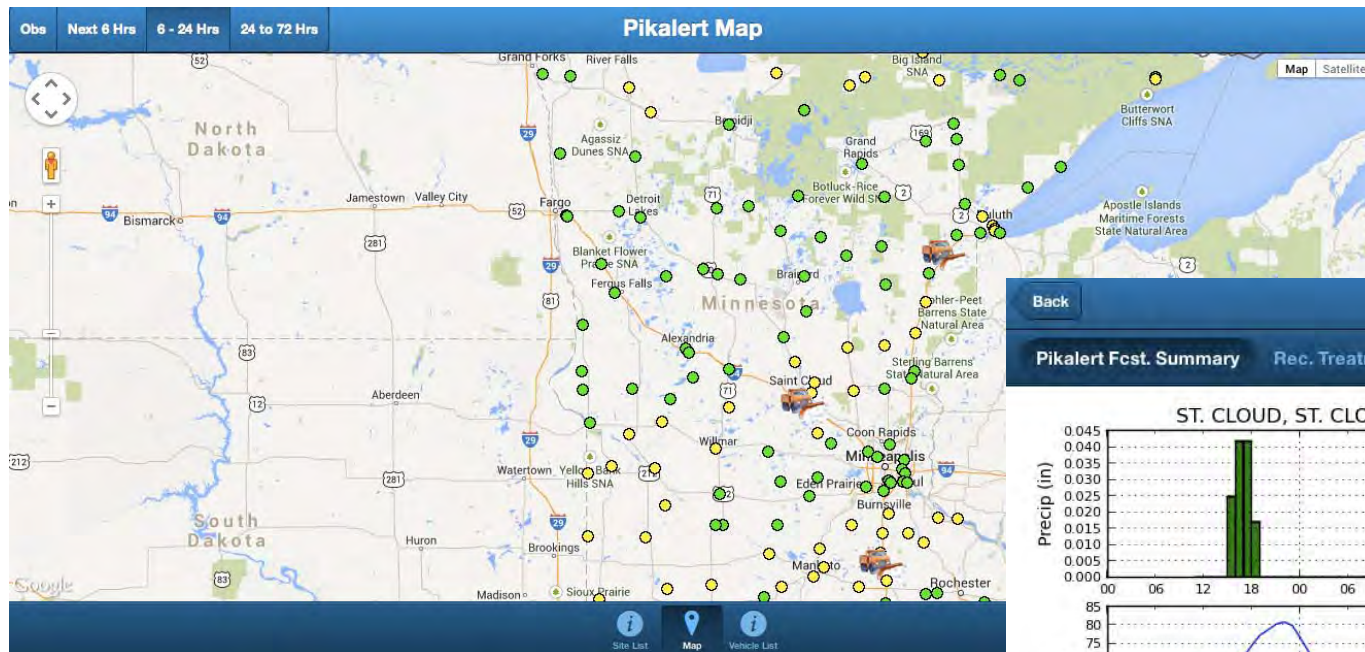
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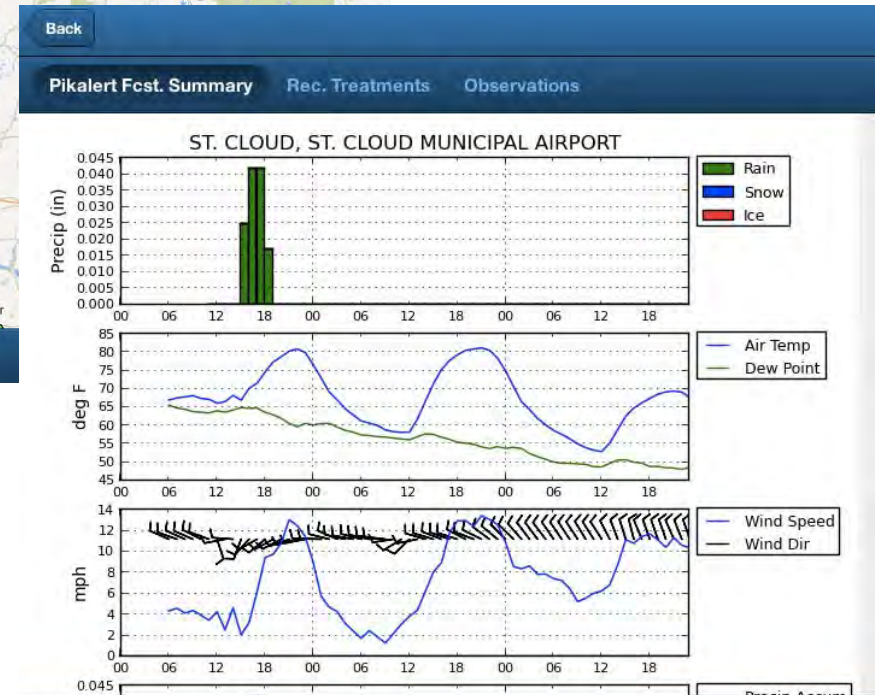
Applications in Development



Enhanced MDSS (EMDSS)



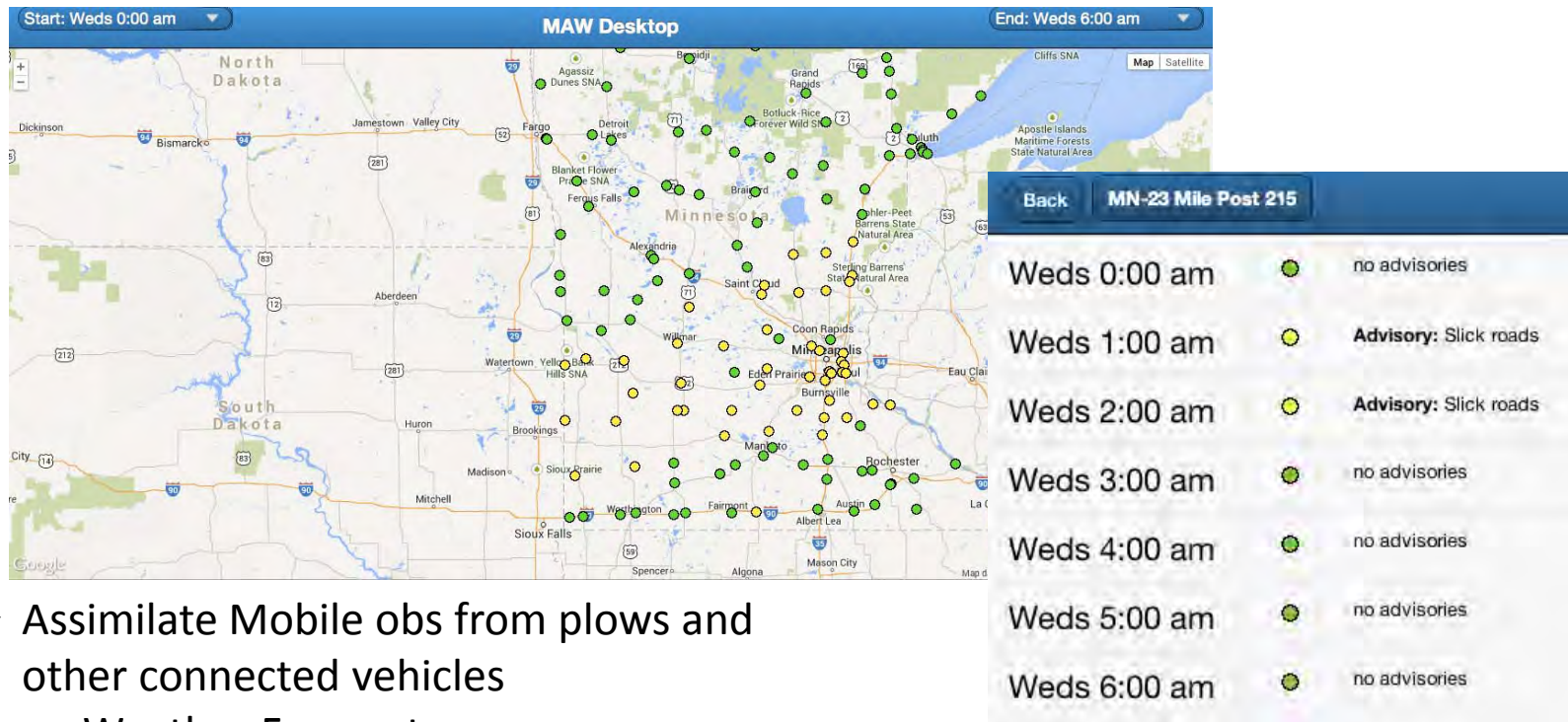
- ❖ Assimilate Mobile obs from plows and other connected vehicles
 - Weather Forecasts
 - Pavement Forecasts
 - Treatment recommendations
- ❖ Web-based interface – laptop, tablet and phone



Applications in Development



Motorist Advisory and Warning (MAW)



- ❖ Assimilate Mobile obs from plows and other connected vehicles
 - Weather Forecasts
 - Pavement Forecasts
- ❖ Web-based interface – laptop, tablet and phone
- ❖ In-vehicle Alert Information

Future Road Weather Needs



- ❖ **Upgraded Pavement Model/Models**
 - Open source (researchers can provide enhancements in a test-bed environment)
 - Included connected vehicle assimilation
 - Gridded model output to cover all roads in Alaska, Lower 48, and Canada
- ❖ **Improved (and less expensive) mobile weather obs**
- ❖ **Mobile Friction, Salinity, Wind and Visibility observations and Forecasts**