A Missing Piece in the
Highly Autonomous Vehicle Safety Puzzle

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*Weather for the Connected World®*

The Safety Promise

Highly autonomous vehicles will increase safety by eliminating human error.

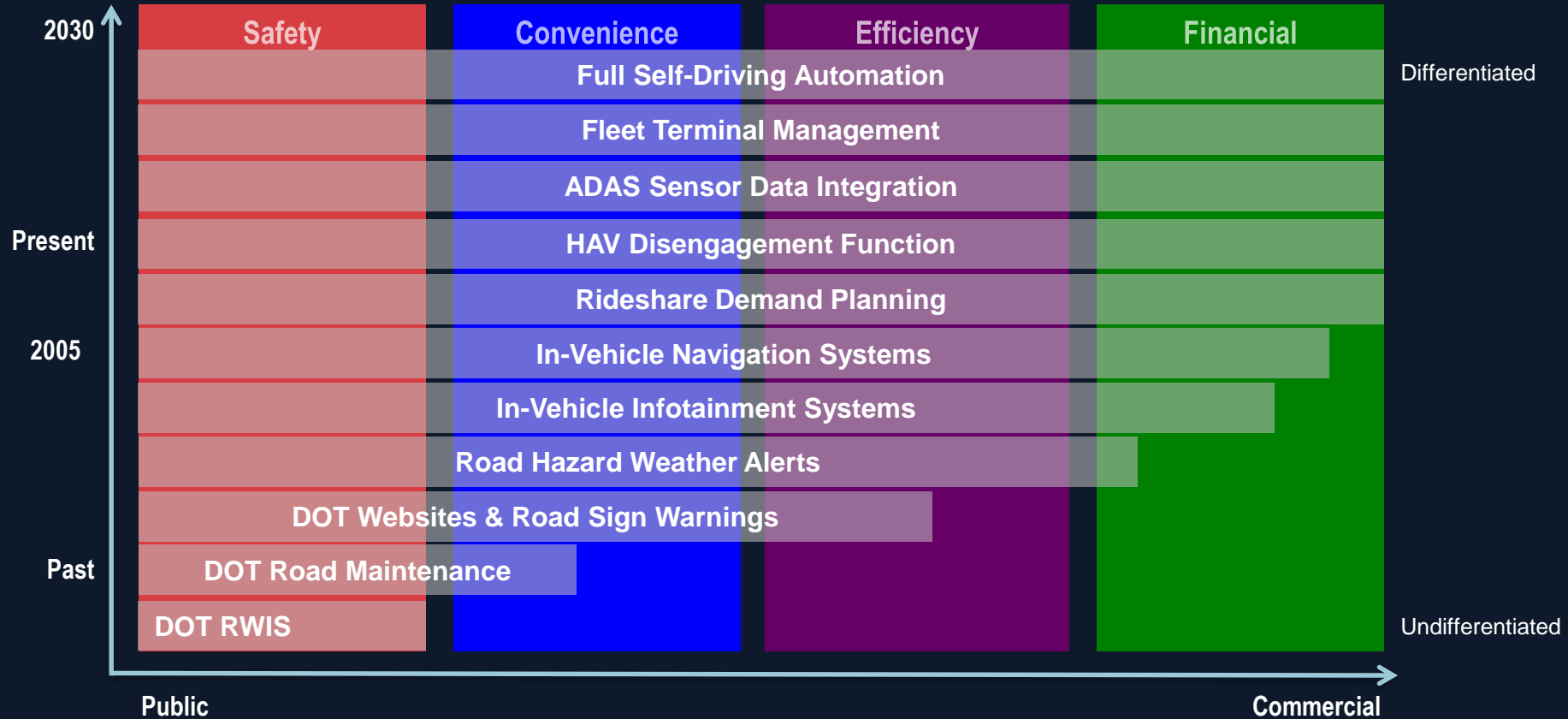Sensors reporting road conditions dry and clear!

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The Problem: Hazardous Road Surface Conditions (RSC)

Road Climatology

Wet Roads
Least — Most

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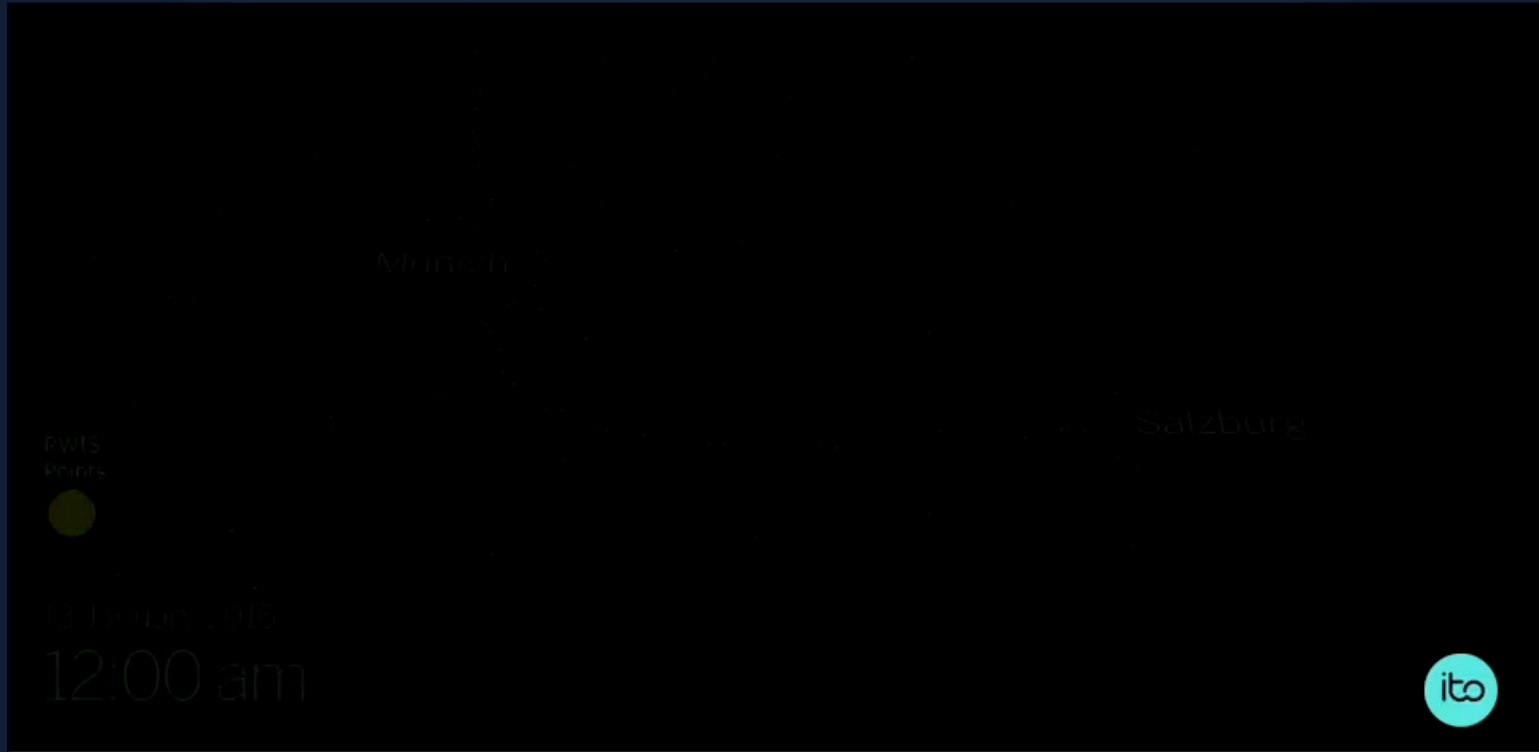Weather for the Connected World®
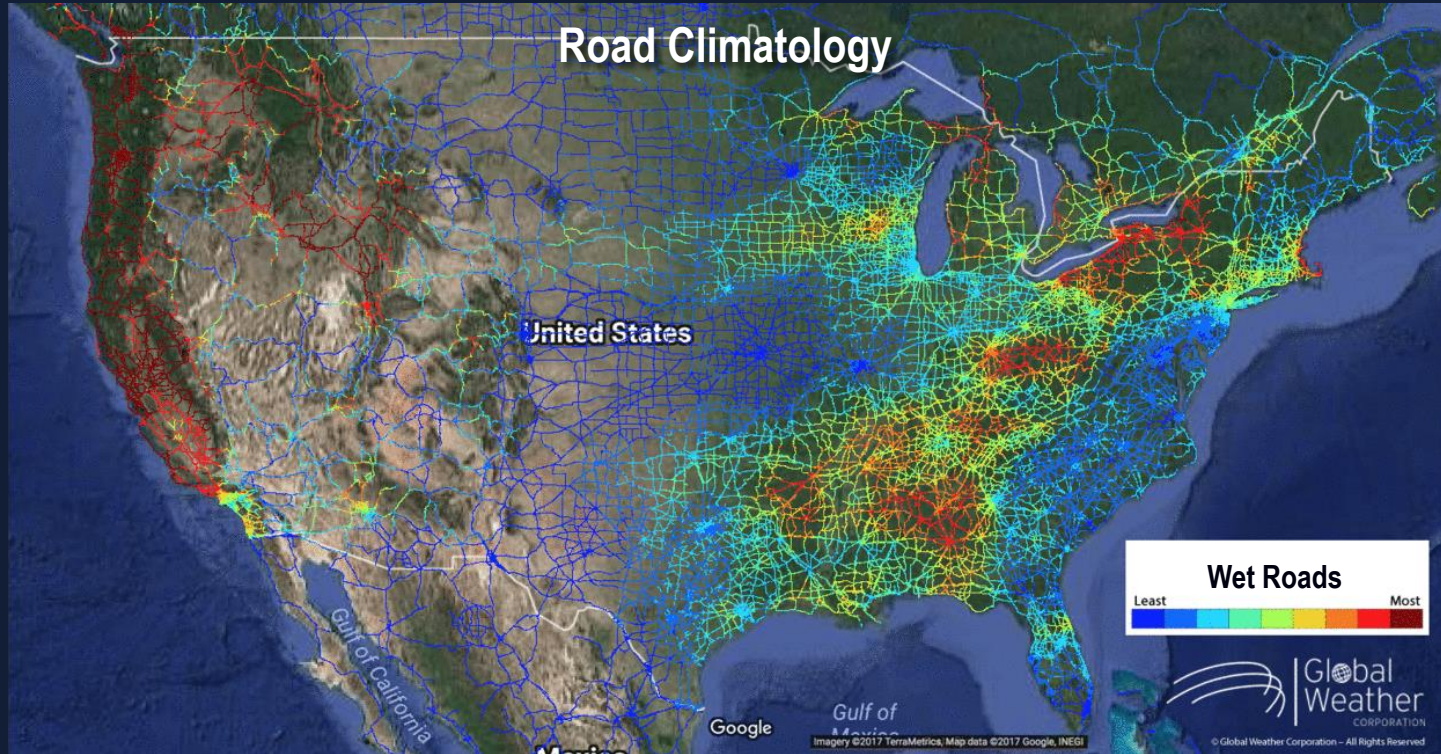
Road Surface Conditions Use Cases: In Step with HAV

Use Case: Connected Vehicle Alerts

Challenge: Road weather stations cannot report road surface conditions at all locations.

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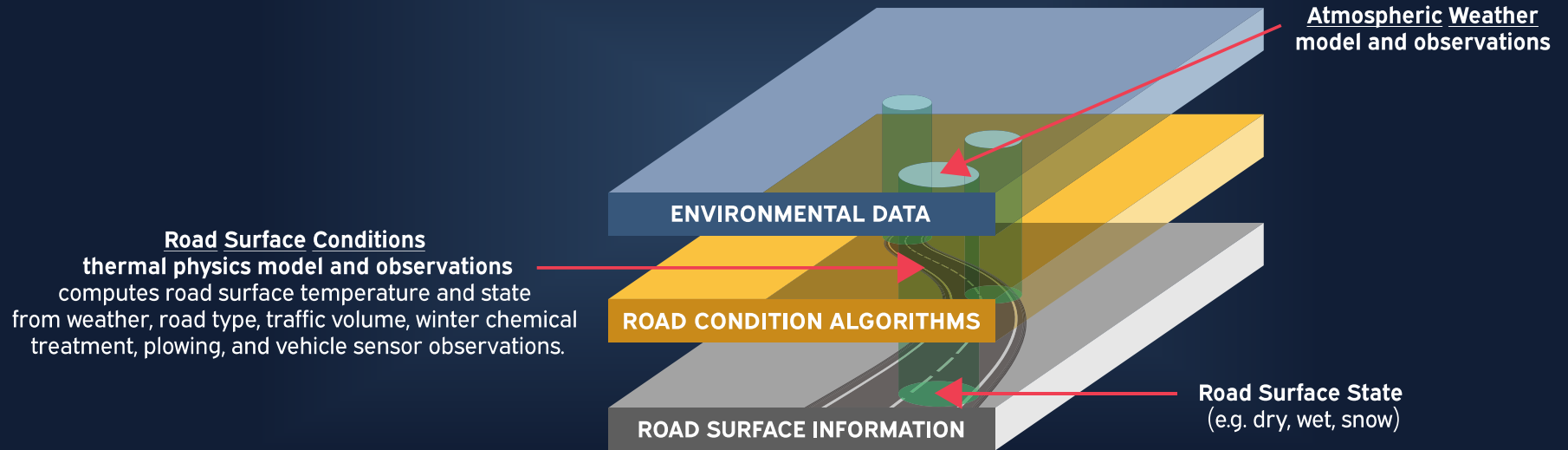
Use Case: Connected Vehicle Alerts

Solution:

A Piece of the Puzzle: Road Surface Modeling

The right methodology for optimal connected and HAV functionality, road surface condition forecasts.

RoadWX® Integrated Modeling

Atmospheric Weather
model and observations

ENVIRONMENTAL DATA

Road Surface Conditions
thermal physics model and observations
computes road surface temperature and state
from weather, road type, traffic volume, winter chemical
treatment, plowing, and vehicle sensor observations.

ROAD CONDITION ALGORITHMS

Road Surface State
(e.g. dry, wet, snow)

ROAD SURFACE INFORMATION

A Piece of the Puzzle: ADAS Observations

Analysis control steps

- 200,000 vehicles in motion
- Temperatures >50°C removed
- Vehicles reporting ≤10 minutes
- 1,927 METAR sites
- 677 RWIS sites
- 15 days in October

ADAS OBSERVATIONS, ALL LOCATIONS, 200,000 VEHICLES OVER 15 DAYS
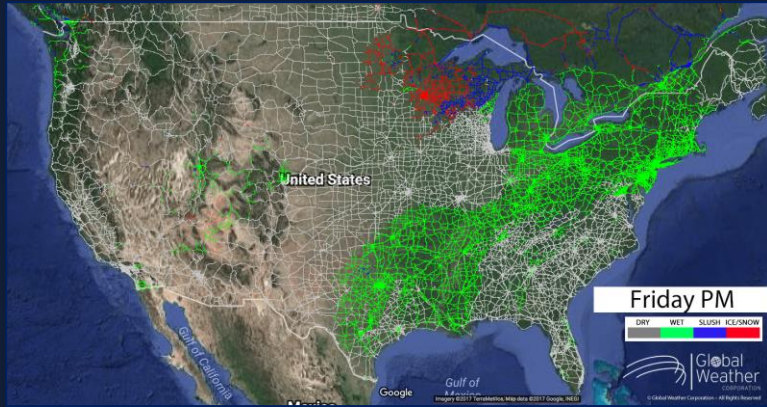
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A Piece of the Puzzle: ADAS Analysis

Conclusions:

1. Individual observations are too noisy for estimating current temperatures (V to V ~6.1° C).
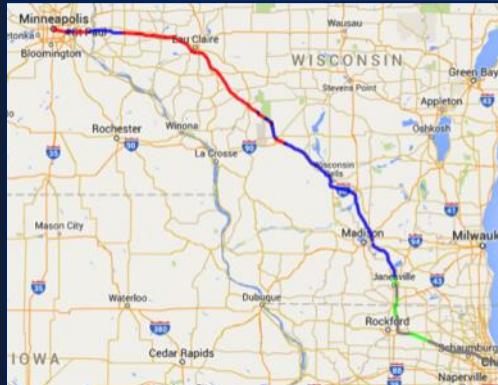2. Traffic flow rate of ~100 instrumented vehicles/.5 hour to achieve acceptable error of (~.5° C).
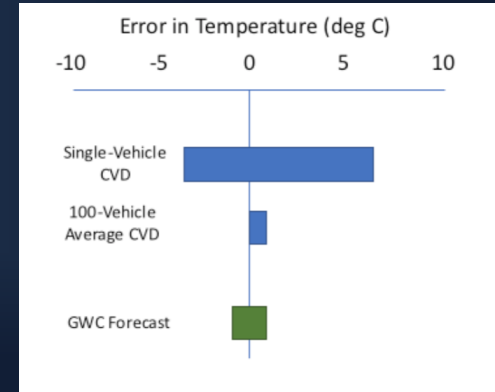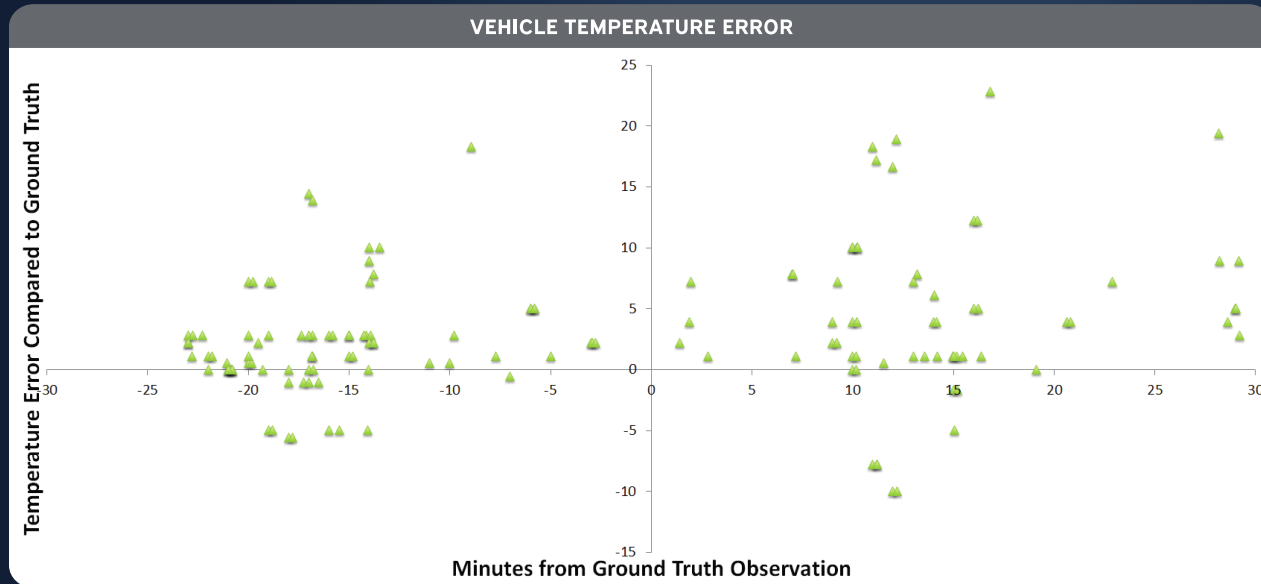
The Solution: Forecast at Every Location

Forecasts current and future conditions
on all road surfaces for any location or route.

- Road surface temperature, wind, precipitation type
- Road surface state (dry, wet, slush, snow, ice)
- Bridges, tunnels

Integrates with any intelligent road network.

- HERE, NavInfo, OSM, TomTom, Google Maps, Apple Maps, etc.

All road types, from primary highways to local routes

Sub-hourly updates (15 min and 5 min)

Thank You

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