

Feature Presentation

Weather Savvy & Truck Parking Pilots

Thomas Murphy

and

Luis Rivera

STATEWIDE TRAFFIC OPERATIONS



NJDOT Weather Savvy Pilot

Weather Savvy Roads – Pilot Project

Outstanding Project Award

Weather Savvy Roads (WSR) won Intelligent Transportation Society of New Jersey (ITSNJ) 2021 Outstanding Project Award



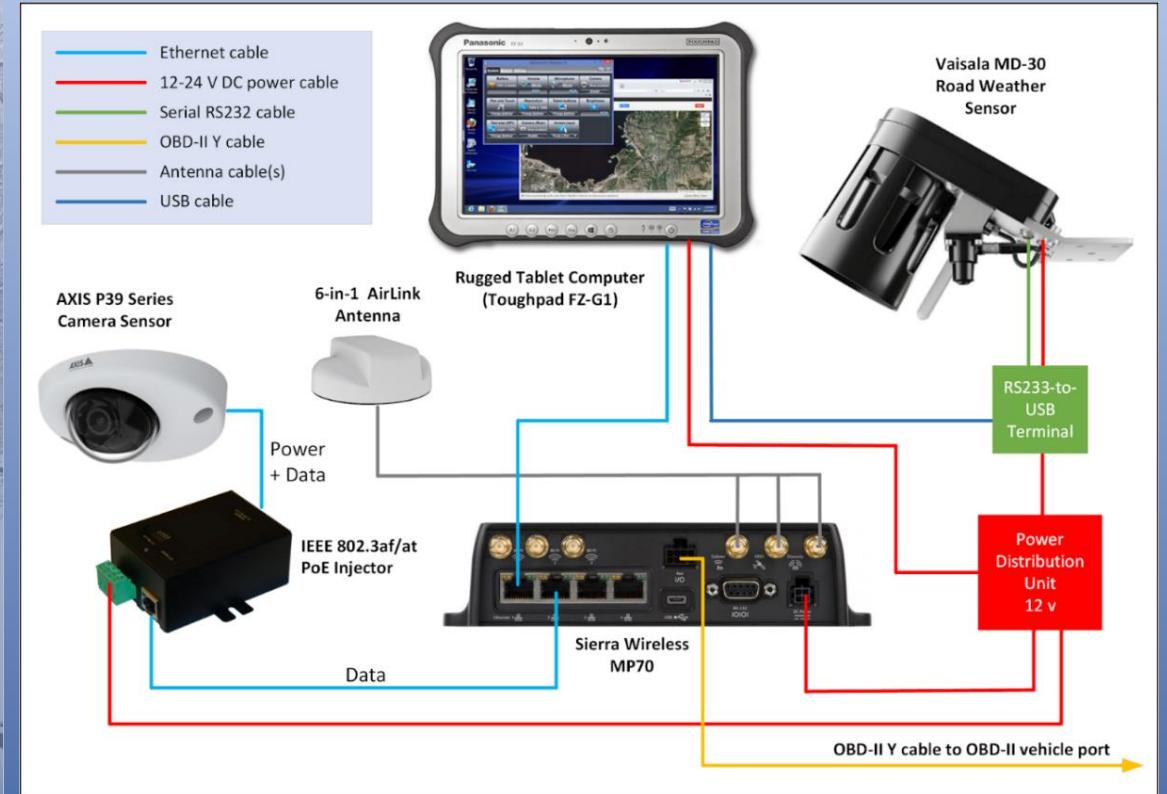
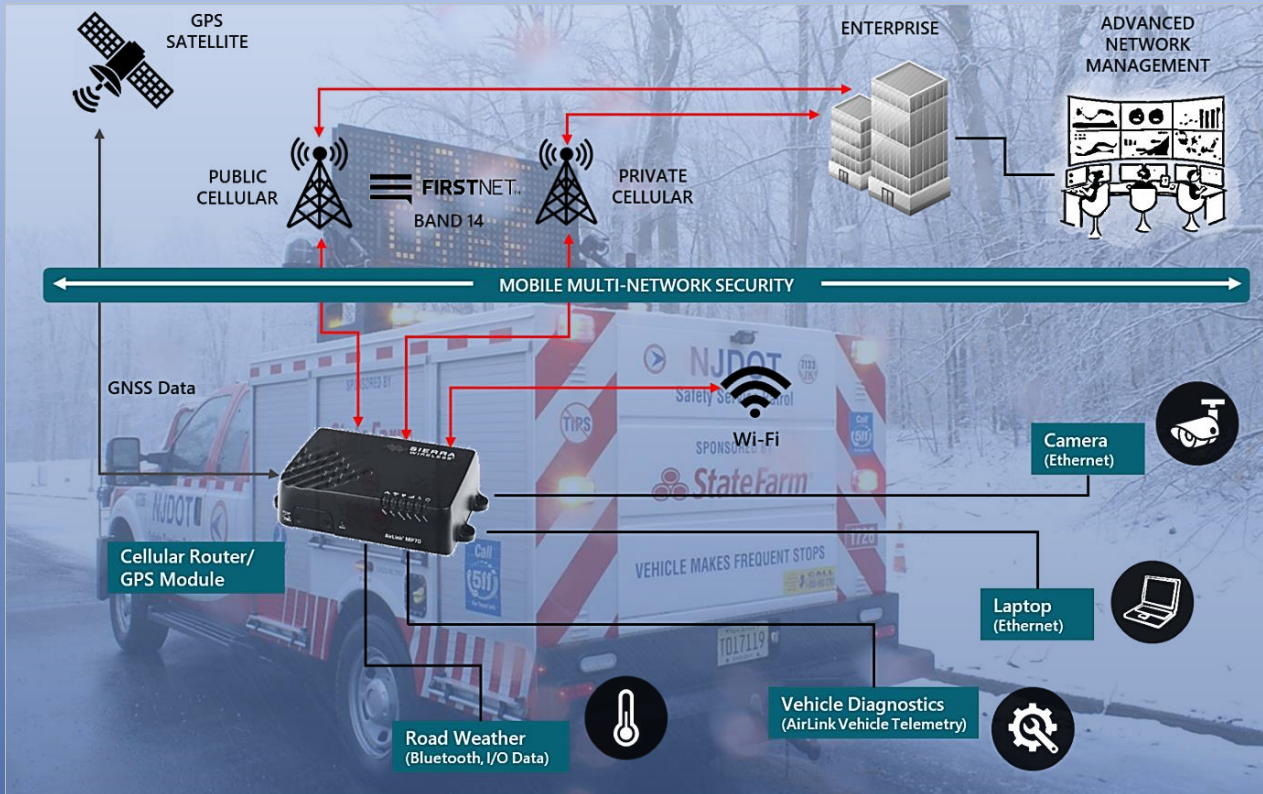
%

Weather Savvy Roads – Pilot Project

- **Objective:** Deploy IoT and CV technology to assist in road weather management:
 - Collect road weather and condition data in real time.
 - Provide data visualization to operators, for situational awareness and decision support.
 - Assist in analysis and planning of road weather management.
- Sponsored by the USDOT Accelerated Innovation Deployment (AID) Program, as implementation of EDC 4 “Weather Savvy Roads Integrating Mobile Observations (IMO)” innovation.



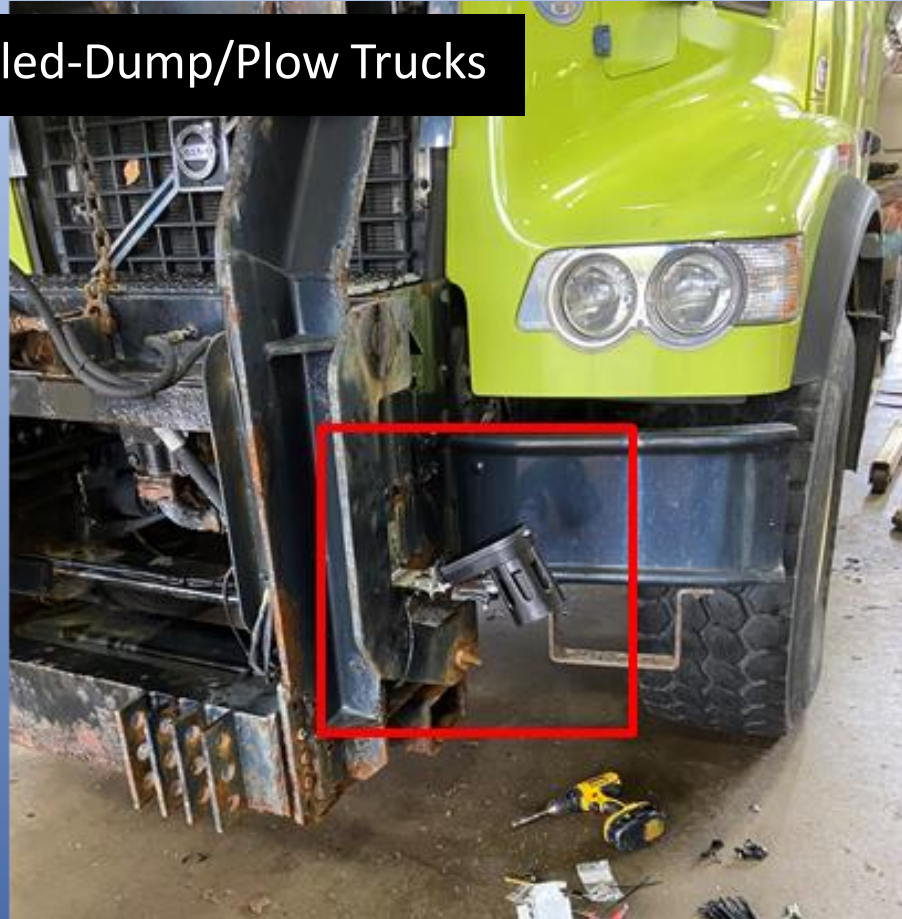
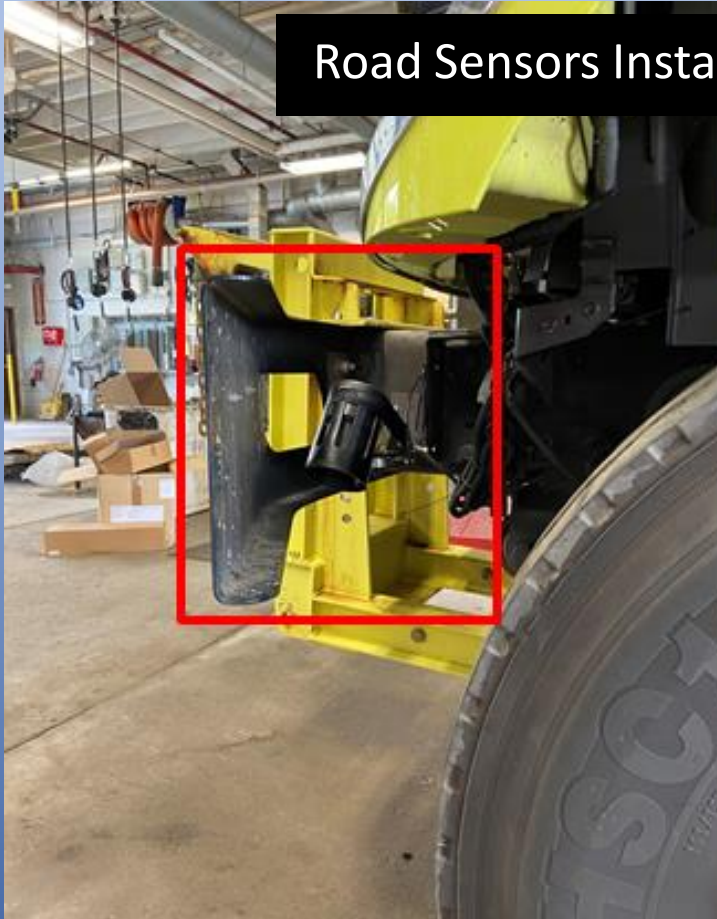
Concept



Weather Savvy Roads – Pilot Project

Instrumentation Process

Road Sensors Installed-Dump/Plow Trucks



Ambient Weather Sensor Installed



Weather Savvy Roads – Pilot Project

Instrumentation Process



Cab Setup – IMRT Truck

Vehicle Instrumentation Status

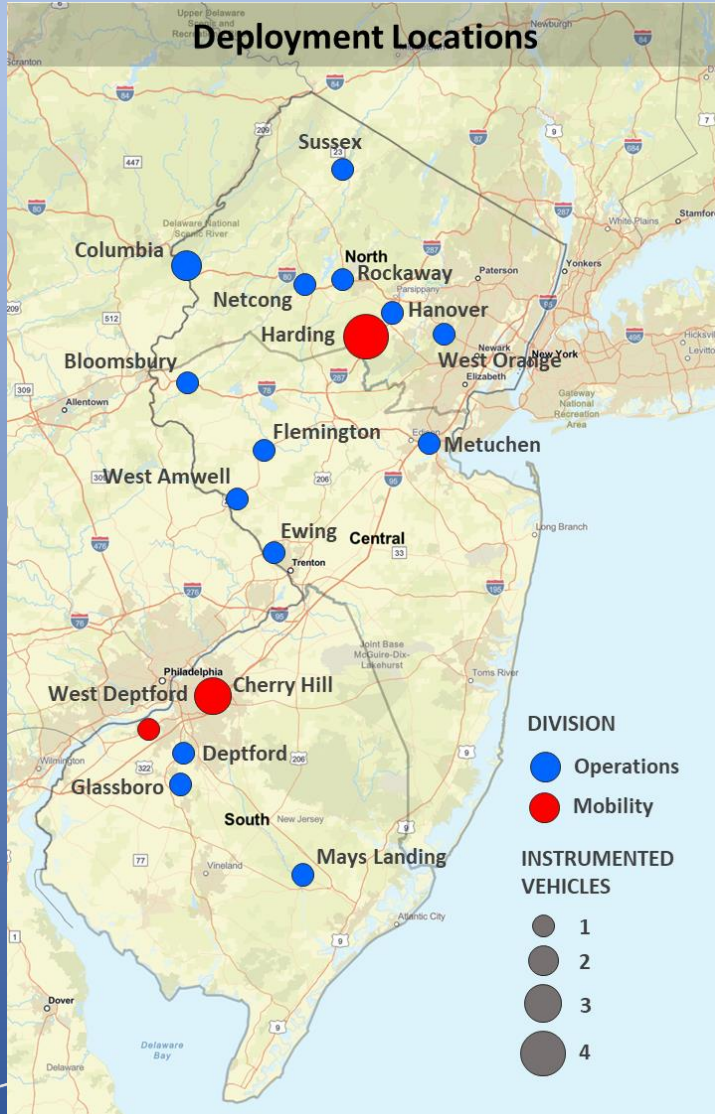
Total Instrumented vehicles in operation- 24

Operations Plow Trucks- 7

Operations Supervisor Pickups- 9

SSP Trucks- 6

IMRT- 2



Operations			Mobility	
North	Central	South	North	South
4 Pickups 3 Plows	3 Pickups 2 Plows	2 Pickups 2 Plows	3 SSP 1 IMRT	3 SSP 1 IMRT

Strategic Implementation of Vehicles

Cover yards assigned to "incline packages"

Cover North/Central/South Operations regions

Cover SSP North/South routes

Weather Savvy Roads – Pilot Project

Web Interface (GUI)

NJ WEATHER SAVVY IMO PORTAL

Vehicle List

- Traffic Mobility (5)
 - North (2)
 - IMRT-N (TD17685)
 - SSP-N #1711 (TD18292)
 - SSP-N #1716 (TD17138)
 - SSP-N #1713 (TD30132)
 - South (3)
 - IMRT-S (TD17684)
 - SSP-S #7512 (TD18484)
 - SSP-S #7513 (TD17784)
 - SSP-S #7529 (TD18297)
- Operations (10)
 - OPS-SAM (TD17956)
 - North (5)
 - OPS-N #026 (TD17682)
 - OPS-N #215 (TD30046)
 - OPS-N #216 (TD17678)
 - OPS-N #220 (TD30240)
 - PLOW-N #216 (TD17770)
 - PLOW-N #227 (TD17151)
 - PLOW-N #231 (TD18246)
 - Central (3)
 - OPS-C #335 (TD17702)
 - OPS-C #336 (TD30052)
 - PLOW-C #338 (TD17525)

Map Legend

- Air Temperature**
 - 100 90 80 70 60 50 40 30 20 10 0
- Surface Temperature**
 - 100 90 80 70 60 50 40 30 20 10 0
- Grip**
 - Low Friction, < 0.6
 - Medium Friction, 0.4 - 0.6
 - High Friction, > 0.6
- Relative Humidity**
 - 100 90 80 70 60 50 40 30 20 10 0
- Road Surface State**
 - UNKNOWN** Data not available or erroneous
 - DRY** Absence of moisture on the road surface (Water/Ice/Snow < 0.015 mm)
 - WET** Thin or spotty film of moisture on the road surface above freezing (32 F) Water: 0.015 - 0.040 mm
 - SLUSH** Continuous film of moisture on the roadway above freezing (32 F) Water: 0.015 - 0.040 mm
 - SLUSHY** Film of slushy moisture detected on the pavement surface. Moisture < ice/snow, and surface temperature < 43 F
 - ICE** Film of ice accumulation on the roadway surface. Snow detected > 0.020 mm, and surface temperature < 43 F
 - ICE** Continuous film of ice on the pavement surface. Ice detected > 0.015 mm, and surface temperature < 43 F

SSP-N #1713 (TD30132) 1/16/2022 8:53:43 PM

Road Temperature: 30 ° F
Air Temperature: 28 ° F
Road Condition: SLUSHY
Dew Point: 28 ° F
Frost Point: 28 ° F
Grip: HIGH

287 S MP: 20.47 - 20.37

SSP-N #1713 (TD30132) 2022-01-16 20:53:48

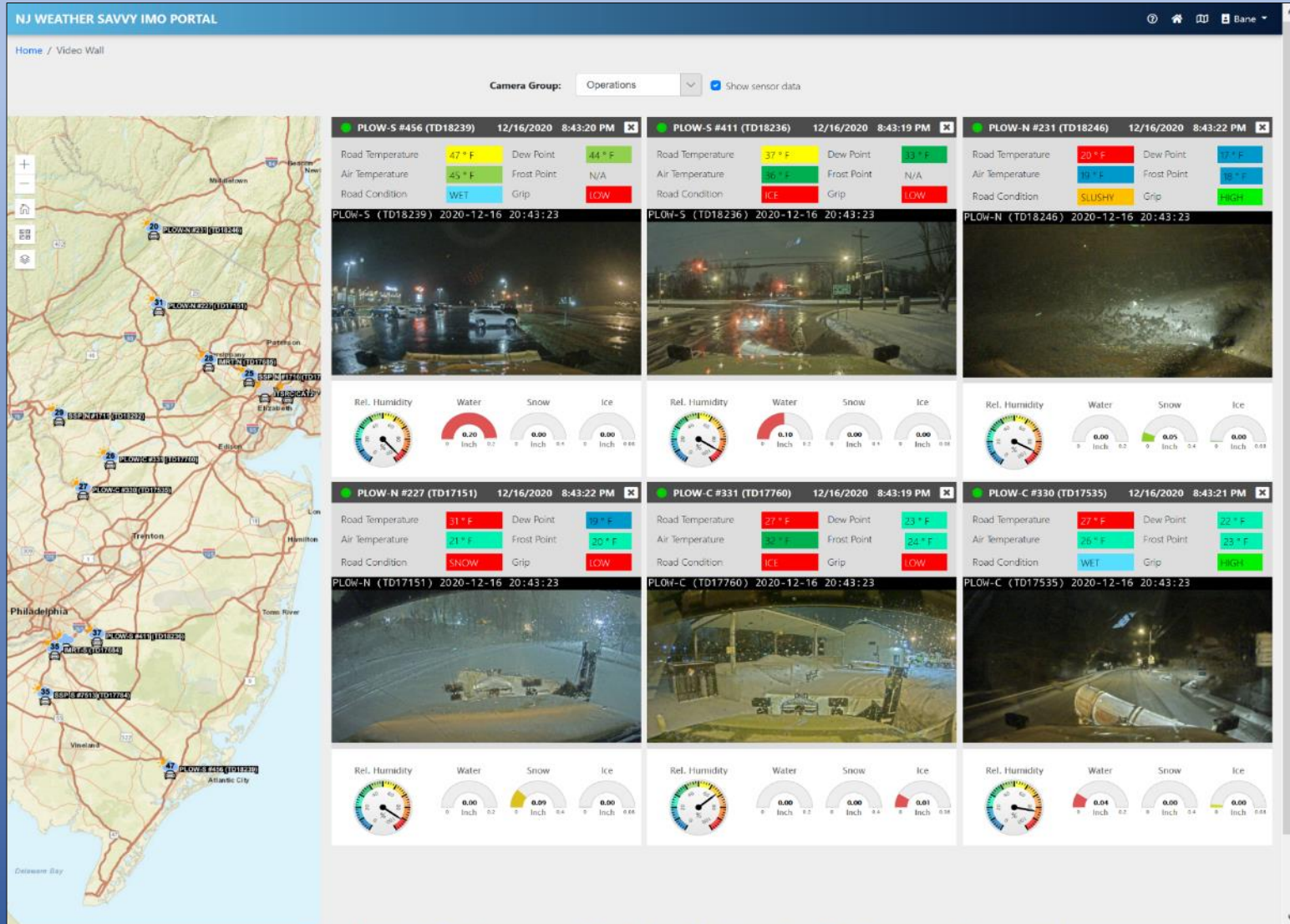
Rel. Humidity: 60%
Water: 0.01 Inch
Snow: 0.00 Inch
Ice: 0.01 Inch

Vehicle trace showing the road condition

Map legend

Weather Savvy Roads – Pilot Project

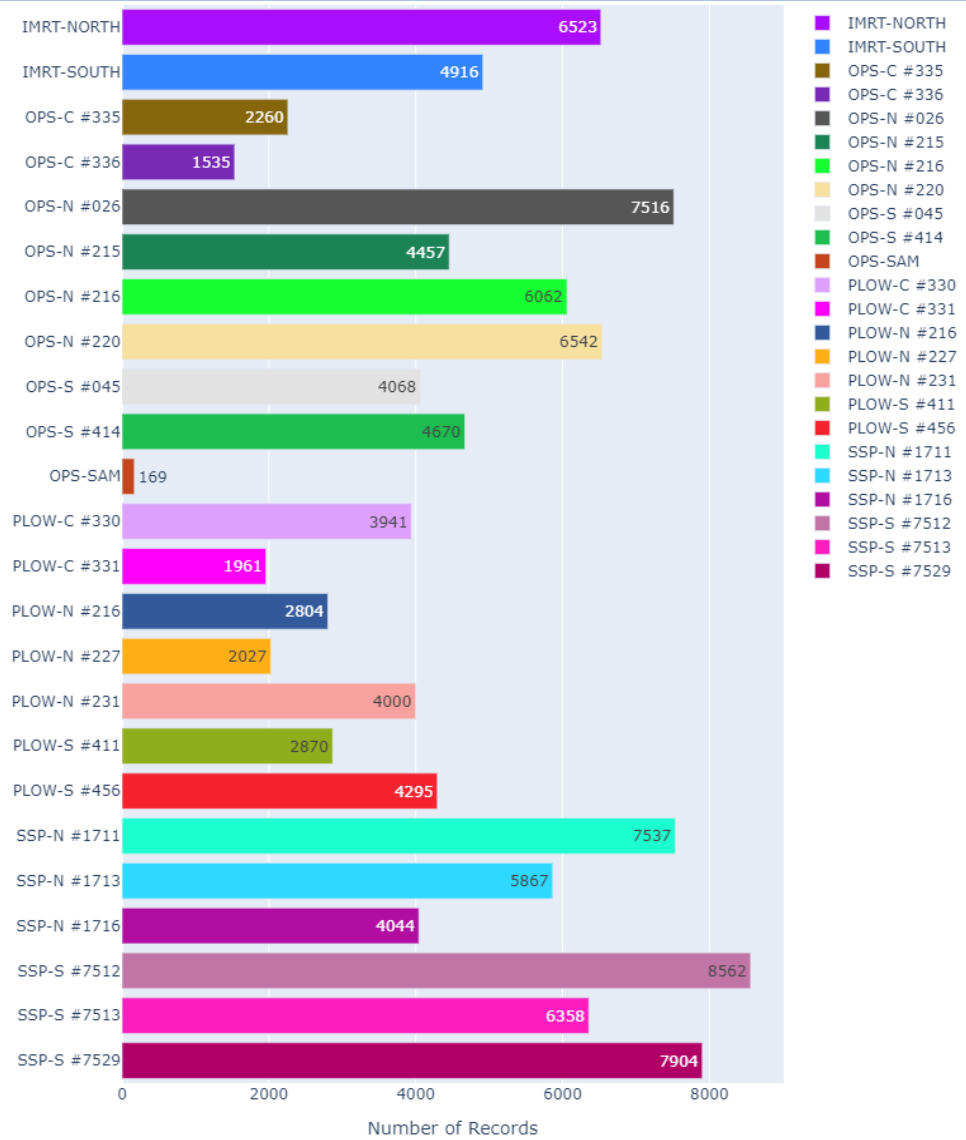
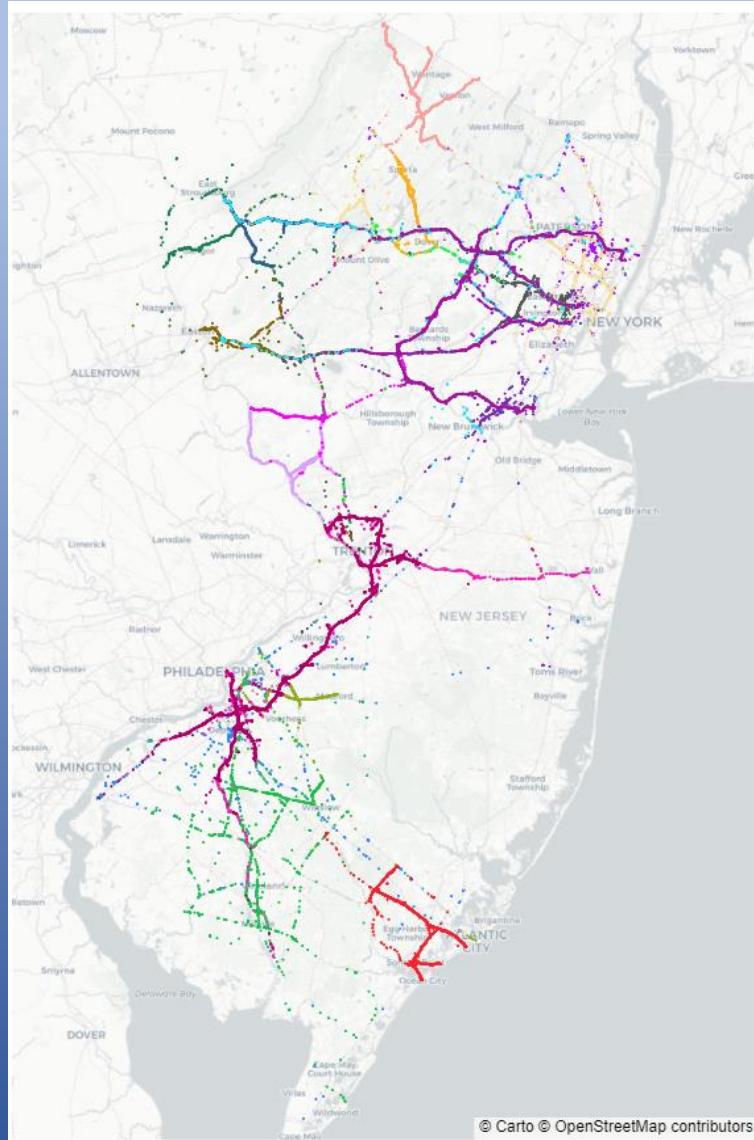
GUI: December 16-17, 2020, Winter Storm



Virtual Video Wall

%

Weather Savvy Roads – Pilot Project



Expansion of Weather-Savvy

- 20 more vehicles (SSP, IMRT, OPS)

Mobility	
North	South
2- 1 SSP & 1 IMRT	2- SSP

Operations		
North	Central	South
4 Plows	4 Plows	6 Plows
2 Pickups	0 Pickups	0 Pickups

- 44 total vehicles
- Increased focus on Plows- during a weather event these trucks stay on the road
- Increased coverage = increased precision/accuracy of our statewide road surface conditions & increased real-time situational awareness

Weather Savvy Roads and Transportation Equity

- Sustainability and Environmental Justice
 - Weather savvy roads can help optimize the road treatment to minimize environmental impacts.
 - Crops and underground water are affected



Project Outcomes

- “I wish I had these sensors on all my vehicles!”
- A great effect of simultaneous visual awareness (video feed) and road weather information (data visualization).
- Helped the operations manager determine the actions (e.g., end or suspend spreading and/or plowing operation).
- Potential to augment the RWIS network with a greater coverage of road weather information.
- Environmental preservation aspect: Potential to assist in optimizing the amount of salt and brine used through integration with the spreading controller.