

# Research Results in the United States

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Team



# Research Groups

- ◆ Transportation Research Board-
  - ◆ Committee on Winter Maintenance
  - ◆ Committee on Surface Transportation Weather
- ◆ Winter Maintenance Technical Service Program – SICOP
- ◆ Aurora –
- ◆ Clear Roads –

# Winter Maintenance Technical Services Program-SICOP

- ◆ Part of American Association of State Highway Transportation Officials - AASHTO
- ◆ Mirror committee to PIARC TC2.4 Winter Service
- ◆ Ensure testing of potential maintenance technologies & Disseminate results
- ◆ Sustainable, systems approach
- ◆ <http://sicop.transportation.org/Pages/default.aspx>

# Aurora

- ◆ International program to research, develop & deploy. Focus is on RWIS, weather forecasting technologies, weather and road condition monitoring for efficient winter maintenance and real time information to road users
- ◆ Currently 15 active research projects
- ◆ Research budget approximately \$250,000 USD per year
- ◆ <http://www.aurora-program.org>

# Clear Roads

- ◆ National research consortium focused on testing materials, equipment, methods used for winter maintenance.
- ◆ Research budget approximately \$600,000 USD per year.
- ◆ Currently 12 active research projects
- ◆ <http://clearroads.org>

# Mobile Observations Iowa Snowplow Cameras

- ◆ iPhones mounted in snow plows capture a photo that shows road condition every 30 minutes
- ◆ Automated Vehicle Location system captures snowplow location
- ◆ Image of pavement condition and location of snow plow displayed on website for users.
- ◆ <http://iowadot.maps.arcgis.com/apps/webappviewer/index.html?id=3d5bc4ec8c474870a19c7e8f44b39c9c>

# Mobile Observations Maintenance Decision Support System

- ◆ Mobile observations of road and weather conditions used to recommend treatment strategies
- ◆ Data represents sensors on snowplows and status data from the snowplow controls and vehicle itself
- ◆ Algorithms from the Vehicle Data Translator convert the raw data into meaningful information about the road conditions.
  - ◆ Windscreen wipers on = precipitation
  - ◆ Plow down = snow
  - ◆ ...
- ◆ Transmitted by mobile phone, radio or other communication means to central server

# Mobile Observations

## Integrated Mobile Observations Project

- ◆ Mobile observations from sensors on snowplows
- ◆ Data used for input into weather applications like MDSS, motorist advisories, warnings etc.
- ◆ Linked to truck engine data center
- ◆ Michigan, Minnesota, Nevada, Federal Highway Administration
- ◆ On-going project – 3<sup>rd</sup> phase of work – ending autumn 2016



# Mobile Observations Connected Vehicle Projects

- ◆ FHWA is preparing a solicitation for a pilot deployment for connected vehicles
- ◆ Will be done in 3 phases and completed in 2018
- ◆ Phase 1 – System Engineering
- ◆ Phase 2 – Prototyping
- ◆ Phase 3 – Regional deployment
- ◆ Weather elements will be included

# Research

## Quantifying Salt Concentration on Pavement

- ◆ Phase 1 identified several vehicle mounted salinity sensors.
- ◆ Phase 2 will evaluate mobile salinity sensors, field trials, analysis and comparisons, develop an Excel Tool for use with the mobile sensors
- ◆ 24 month project-finished autumn 2016
- ◆ Participate in a survey of Mobile Salinity Sensors.  
[https://www.surveymonkey.com/s/winter\\_maintenance\\_salinity\\_sensors](https://www.surveymonkey.com/s/winter_maintenance_salinity_sensors)

# Mobile Automated Winter Road Condition Reporting System

- ◆ Field Test and Evaluation of a Mobile Automated Winter Road Condition Reporting System, Ontario
- ◆ Uses Automated Vehicle Location and smart phone images
- ◆ Generates automated road surface conditions
- ◆ Evaluated against fixed spectroscopic sensors with good results
- ◆ Regional field trials planned in Michigan and Iowa

# Thank you for your attention

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