Development & Deployment of NCTIP-Compliant Mobile Maintenance Data Collection

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Mobile Data Collection Supports Maintenance Decision Support

If you know…
- Road characteristics
- Current conditions
- Weather forecast
- Physics & chemistry of snow, ice, chemicals
- Available resources (material, equipment, schedule)

...then you can recommend...
- Treatment type
- Application rate
- Optimal timing

...and predict
- Future road conditions with or without treatments
MDSS modeling requires knowledge of plowing and chemical applications.
Project Objectives

- Assess suitability of SDDOT fleet for MDC
- Develop functional and physical specifications for MDC
- Define NTCIP-based protocols for truck-to-center communications
- Build & evaluate a functioning field controller
- Recommend a cost-effective deployment strategy
Project Tasks

- Statewide inventory and assessment of SDDOT’s fleet to
- Define functionality needed for winter maintenance, traveler information, and traffic operations
- Develop a concept of operations and a high-level design
- Develop and submit a detailed instrumentation design & specification
- Define NTCIP-based communications protocols
- Develop detailed field controller design and equipment specification
- Develop a testing plan for evaluating pilot systems
- Build and install field controllers on four plow vehicles
- Revise design and specification documents
- Prepare a final report
- Make an executive presentation
What is NTCIP?

- National Transportation Communications for ITS Protocol
- Administered by
  - National Electronics Manufacturers Association (NEMA)
  - American Association of State Highway and Transportation Officials (AASHTO)
  - Institute of Transportation Engineers (ITE)
- Standard protocol for polled field-to-center communications
Mobile Data Collection

Automatically records:
- Vehicle location
- Material application
- Plows up/down
- Air, surface temperature
MDC Touch Screen

Collects Information on:
- Highway
- Truck/Plows
- Materials
- Weather
- Road Conditions

Provides:
- Current weather
- Weather forecast
- Treatment recommendations
Key MDC Data Objects

From GPS
- essLongitude
- essLatitude

From Spreader Controller
- sddotSolidMaterial DispenseRate
- sddotLiquidMaterial DispenseRate
- essAirTemperature
- essSurfaceTemperature

From Plow Switches
- sddotPlowBlade Description
- sddotPlowBlade Position

From Touchscreen
- sddotPaveTreatTypeSolid
- sddotPaveTreatTypeLiquid
- sddotHwyDirection
- sddotHwyNumLanes
- sddotHwyTurnLane (y/n)
- sddotHwyTreatLane1
- sddotHwyTreatLane2
- sddotHwyPlowLane
- essSurfaceStatus
- essPrecipitationSituation
- essVisibilitySituation
- essWindSensorSituation
- sddotVehicleURL.0
SD Deployment Plans

- Lead & participate in MDSS Pooled Fund Study
- Expand MDSS to Interstate and other major routes in SD
- Expand MDC from 4 pilot units to >100 operational units
Questions?

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