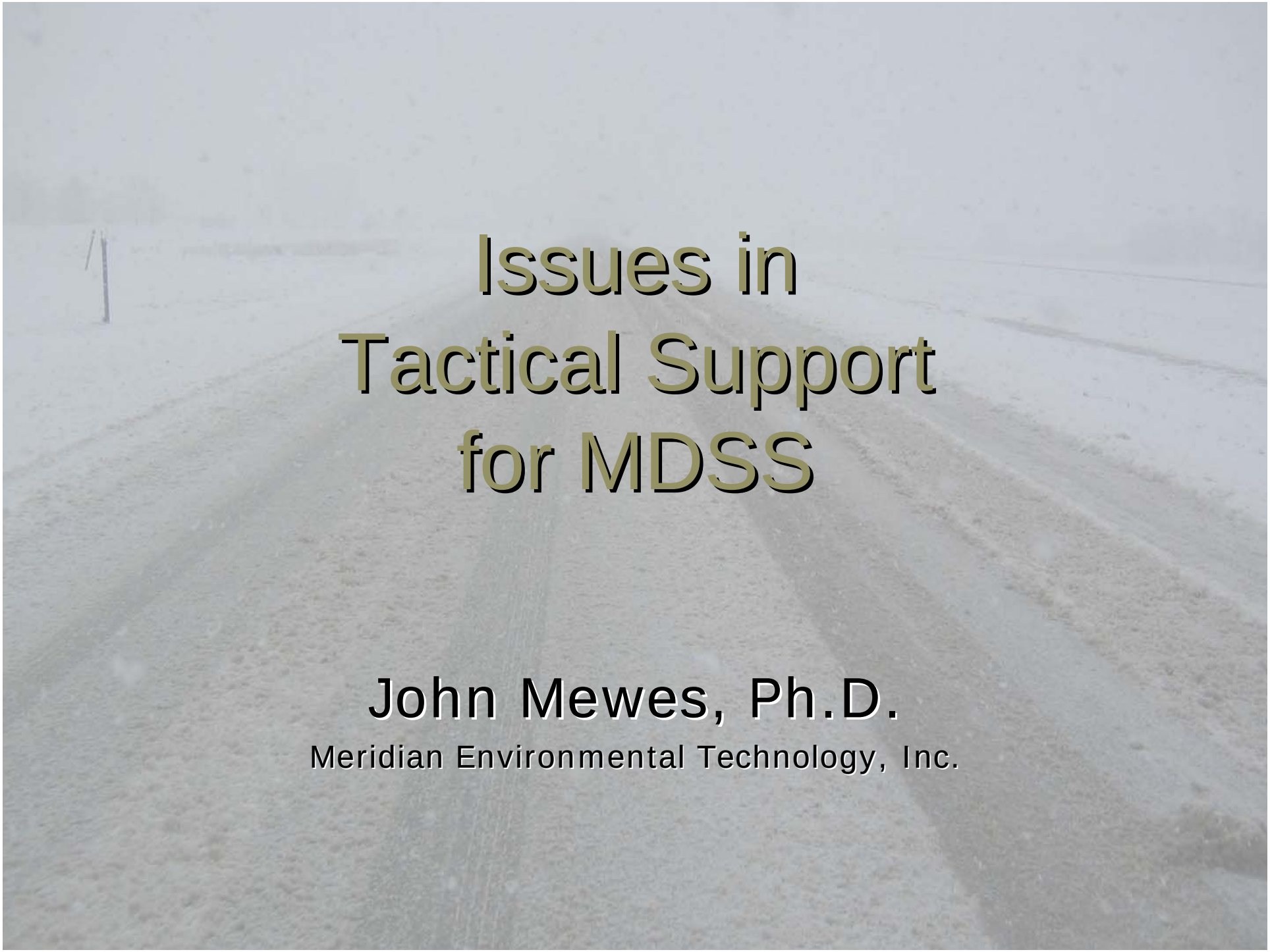
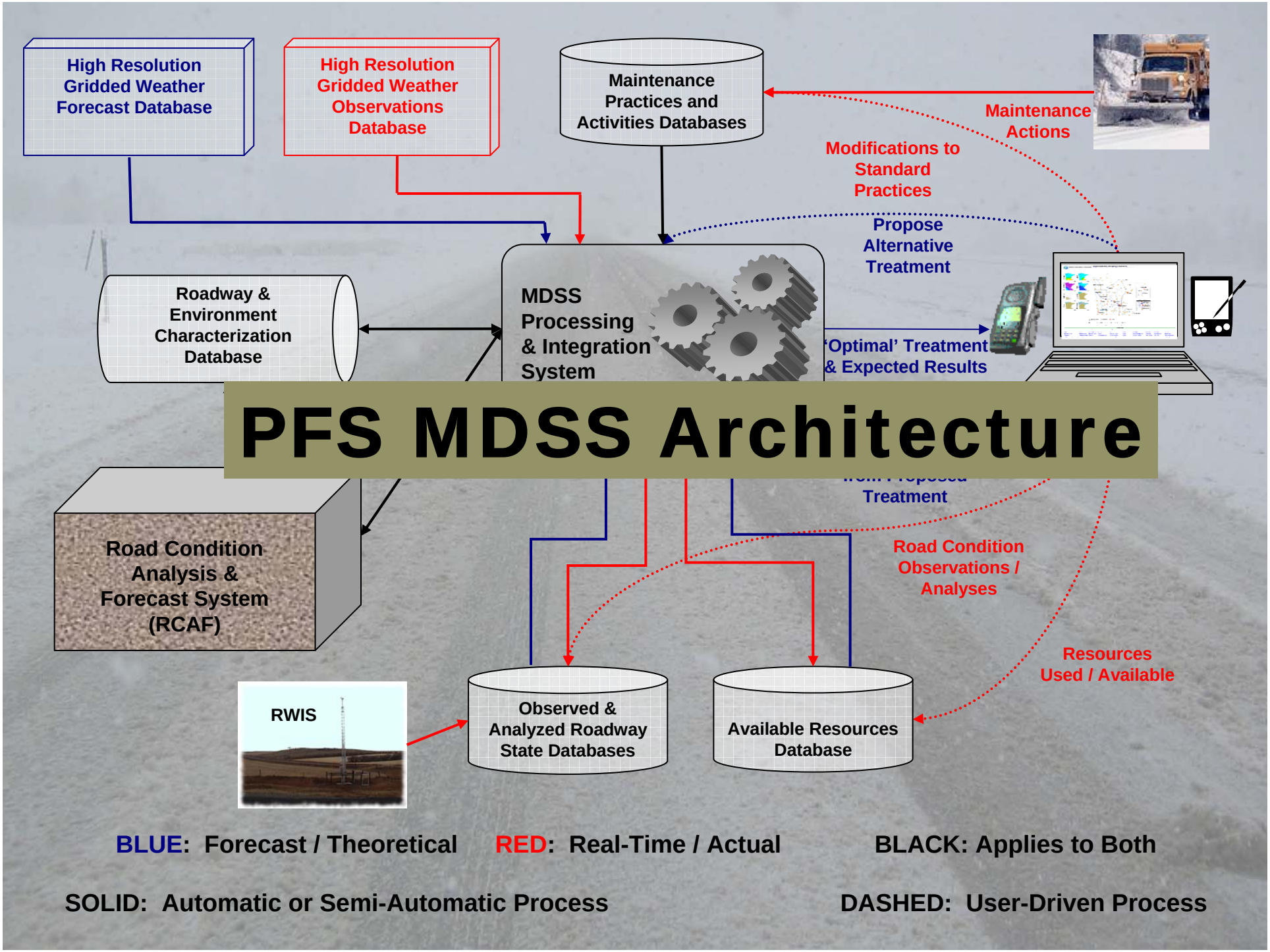


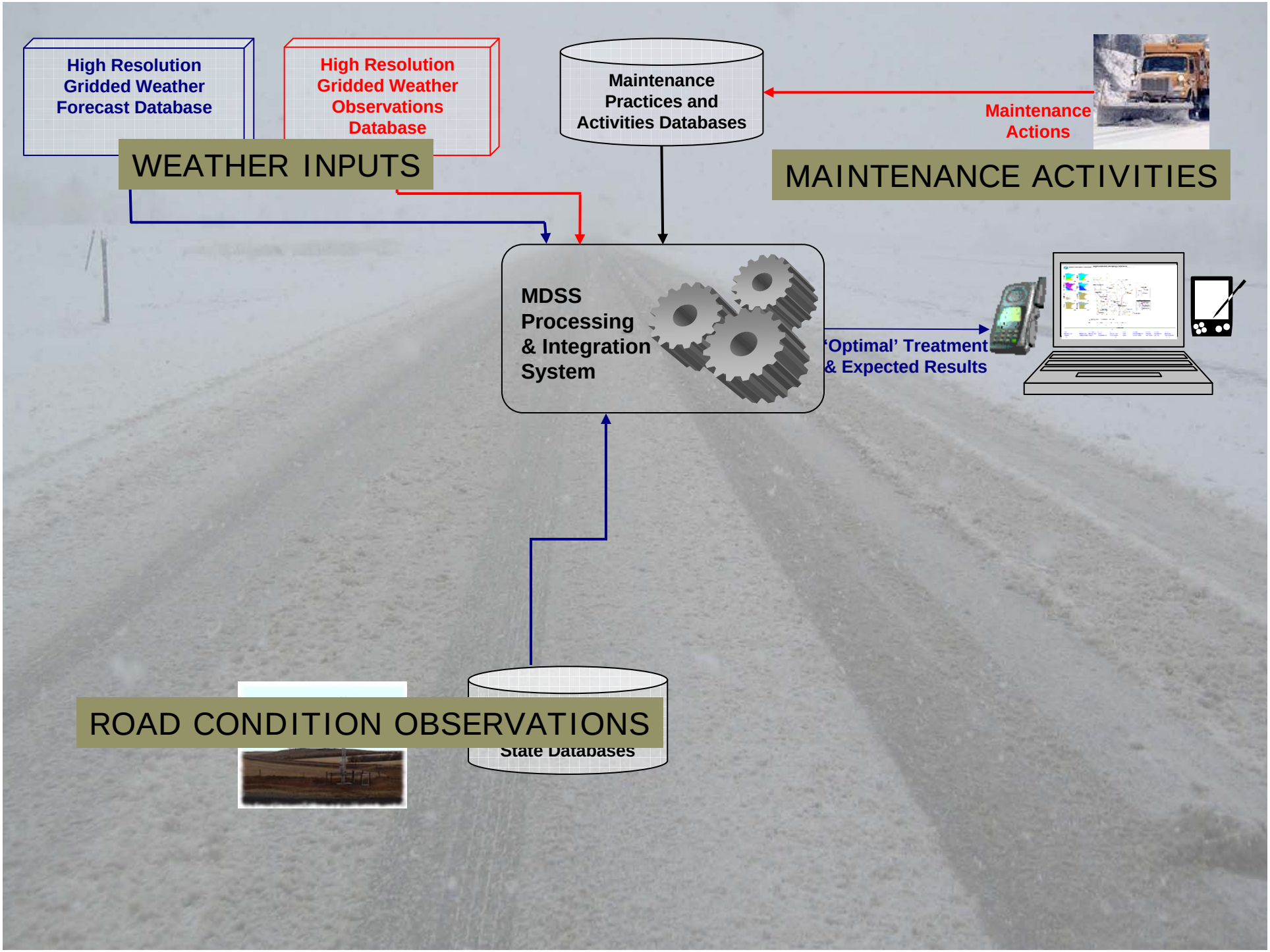
Issues in Tactical Support for MDSS

John Mewes, Ph.D.

Meridian Environmental Technology, Inc.

PFS MDSS Architecture




High Resolution Gridded Weather Forecast Database
High Resolution Gridded Weather Observations Database
WEATHER INPUTS
Maintenance Practices and Activities Databases
Maintenance Actions
MAINTENANCE ACTIVITIES
MDSS Processing & Integration System
'Optimal' Treatment & Expected Results
ROAD CONDITION OBSERVATIONS
State Databases

Tactical Support: Weather Information

- Wintertime precipitation observations
  - real-time information on intensity / rate lacking
  - significant distances between observations
  - consistency between sensors
  - QC needed, but difficult
- Radiation information
  - very few observations available, vitally important
- Drifting snow
  - Not well observed by existing networks
  - Not easily modeled due to lacking info on snowpack conditions
- Weather forecast update frequency
  - forecast needs to reflect current conditions, project evolution
  - labor intensive if done by forecaster, difficult to automate in light of lacking precipitation observations

Tactical Support: Road Condition Information

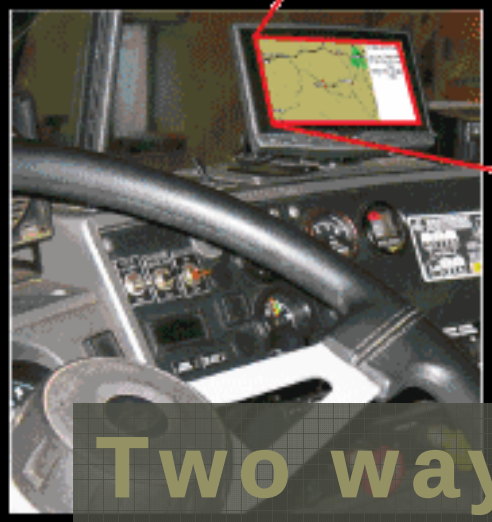
- RWIS
  - Limited coverage
  - Accuracy is suspect in some cases, QC difficult
  - Some conditions more usable than others
- Agency
  - Existing feeds don't update frequently
    - Can still get time-lagged value using pavement model
  - Dictionary conversions, spatial variability
- MDC/AVL
  - Consistency of data entry between drivers
  - Picking most appropriate condition out of varying entries
  - Meshing with maintenance activity information, i.e. don't want to undo the corresponding maintenance action in the model

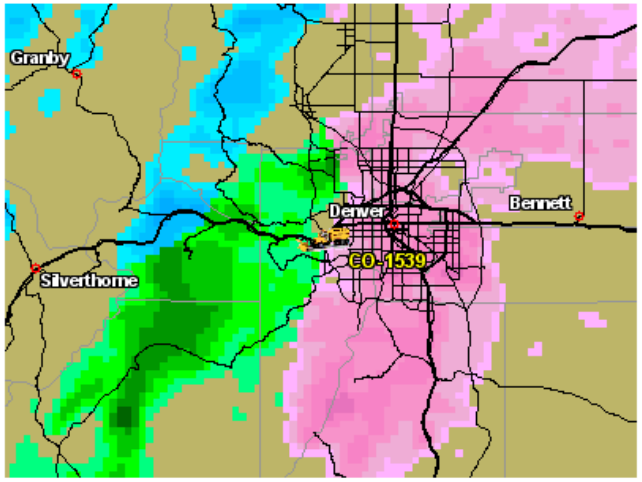
Tactical Support: Maintenance Data Collection

- Consistency of entry
  - We presently must rely on the driver to input some information, such as lane, material, and/or application rate
- Interfacing with truck
  - Gathering data from spreader controller can be difficult
  - Sensing plow positions
- Standards would be beneficial
  - At the controller interface
  - At the point of distribution outside the system
- Interpretation is complex
  - MDC/AVL yields GPS-based measurements of conditions
  - Agencies generally want aggregated information for maintenance routes

In-Vehicle MDSS

(IWAPI system working with PFS MDSS)





Recommended Actions:

Start Time	Practice	Rate
For I-70A, MP 258.72-265.73, Passing:		
Wed 02:16 MDT	Ice Slicer	100lbs
For I-70A, MP 265.73-269.01, Driving:		
Wed 02:16 MDT	Ice Slicer	100lbs
For I-70A, MP 265.73-269.01, Middle:		
Wed 02:16 MDT	Ice Slicer	100lbs
For I-70A, MP 265.73-269.01, Passing:		
Wed 02:16 MDT	Ice Slicer	100lbs

Forecast:

Time	Wind speed (miles/hour)	Wind Direction	Precip Type	Precip Prob (%)	Snow Rate (in/hour)	Cloud Cover (%)
Tue 14:00 MDT	2	NNE	RA	70	-	100
Tue 15:00 MDT	2	NNE	RA	90	-	100
Tue 16:00 MDT	2	NNE	RA	90	-	100
Tue 17:00 MDT	2	NNE	RA	80	-	100

Two way MDSS - MDC / AVL data flow maximizes tactical value

Tactical Support: MDSS Processing

- Keeping up with the flow of data
  - Weather information
    - New observations (nearby METAR, RWIS, radar data, etc.)
    - New forecasts
  - Road condition information
    - Prioritization needed. If a report comes from a user, push it through quickly. If not, push it through on a (frequent) schedule.
  - MDC/AVL information
    - Always coming in, piece by piece. How often does MDSS readjust to account for this changing picture?
    - How much of a maintenance run should be finished before MDSS processes its effects?