



# Alaska Department of Transportation & Public Facilities

Enhanced Maintenance Decision Support System (MDSS)  
and Agile Assets MMS

ITS Alaska

*Keep Alaska Moving* through service and infrastructure



# Enhanced Maintenance Decision Support System (EMDSS)

## Why EMDSS?

- Our Customers Demand A Higher Level Of Service, Which Drives The Need For Reliable, Current Information
- Budget/Staffing Constraints Require Increased Efficiency In Storm Responses
- Difficulty In Forecasting Weather Across The District Dictate The Need To Provide A Specific Response
- Environmental Concerns With Anti-Icing And De-Icing

# Enhanced Maintenance Decision Support System (EMDSS)

- **Key Tool In Our Toolbox**
- **Provides Pinpoint Forecasts**
  - **Allows Efficient Allocation Of Resources**
  - **Mobile Operations Yield Real-Time Data / Increase Flexibility**
- **Recommends Course Of Attack**





# Enhanced Maintenance Decision Support System (EMDSS)

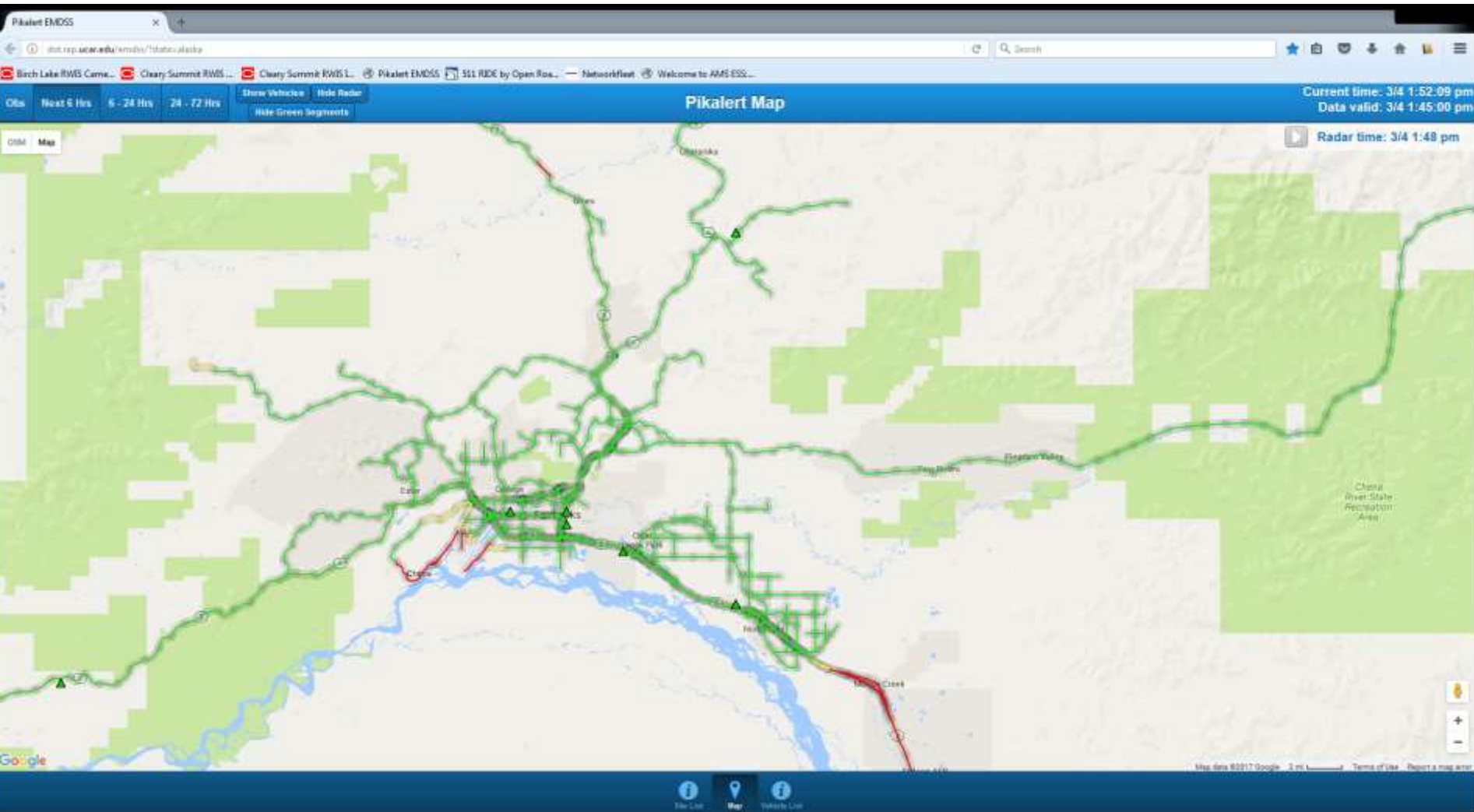


# Enhanced Maintenance Decision Support System (EMDSS)

## Mobile Weather System



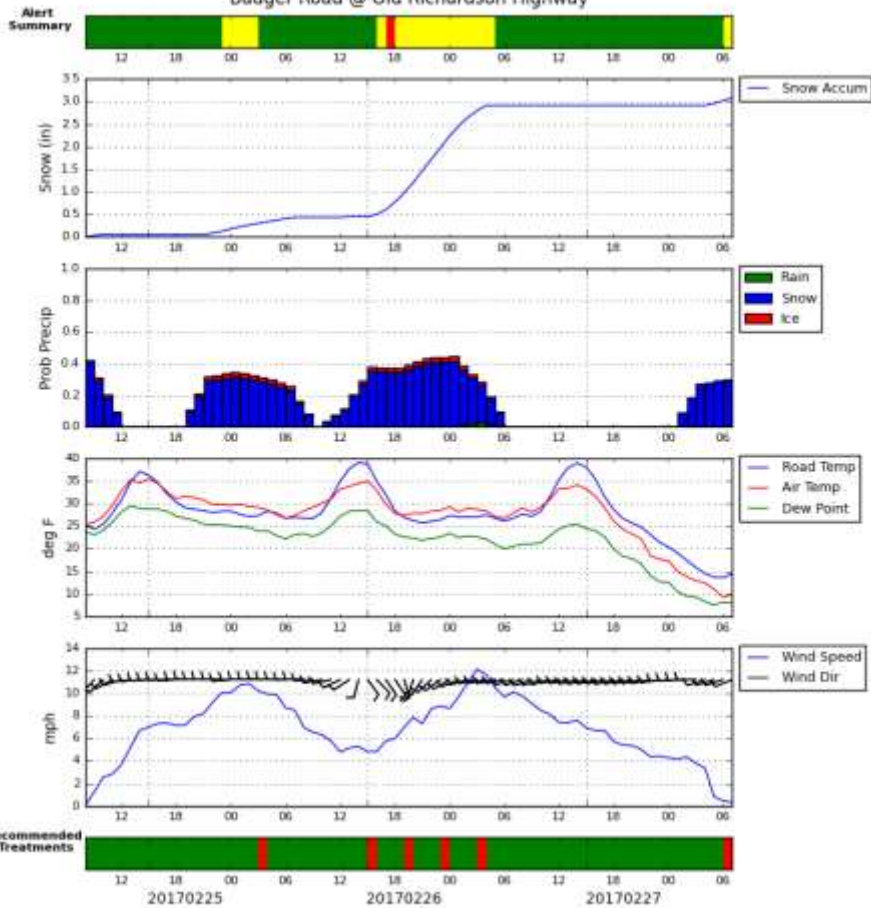
# Enhanced Maintenance Decision Support System (EMDSS)



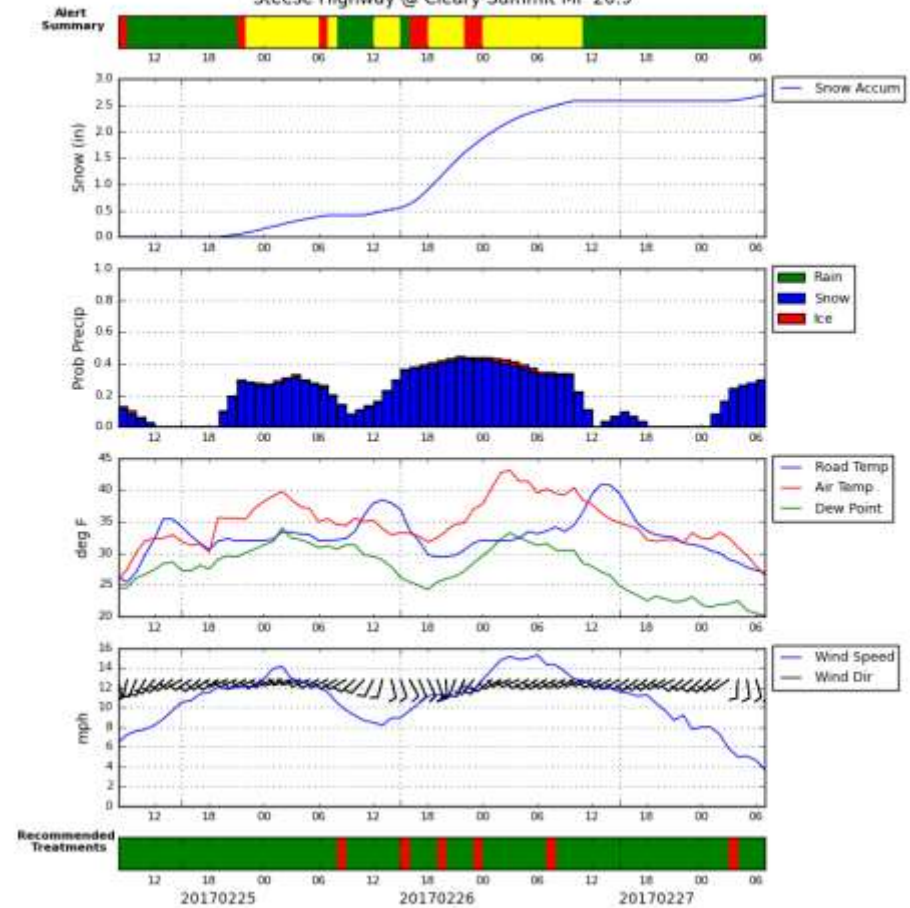


# Enhanced Maintenance Decision Support System (EMDSS)

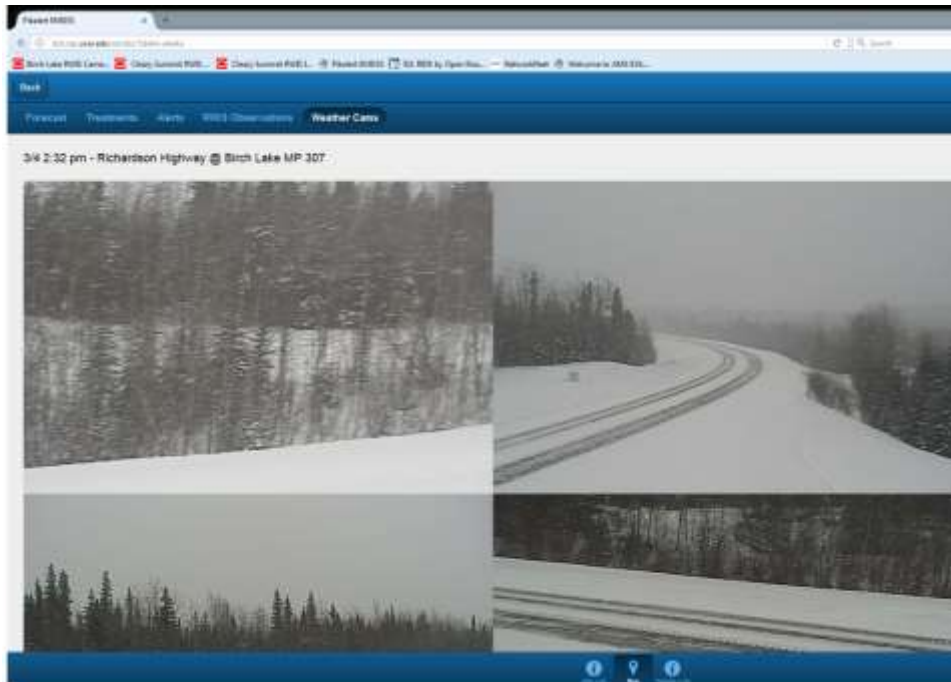
Badger Road @ Old Richardson Highway



Steese Highway @ Cleary Summit MP 20.9



# Enhanced Maintenance Decision Support System (EMDSS)



Pikalent EMDSS	
http://dot.rep.alaska.gov/emds/17040401/aleksa	
Birch Lake RWIS Cam... Clearly Summit RWIS L... Clearly Summit RWIS L... Pikalent EMDSS 311 NDE by Open Roa... Networkfleet Welcome to AMS	
Back	
Forecast Treatments Alerts RWIS Observations Weather Cams	
Site Name	Richardson Highway @ Birch Lake MP 307
Site Type	RWIS
Temperature	9.32 deg F
Road Temperature	missing
Road Temperature	missing
Road State	missing
Sub Surface Temp	missing
Sub Surface Temp	missing
Wind Speed	8.70 mph
Wind Dir	295.00 degree
Relative Humidity	75.00 percent
Observation Time	2017-03-04 14:20:00



# Enhanced Maintenance Decision Support System (EMDSS)

- Alerts

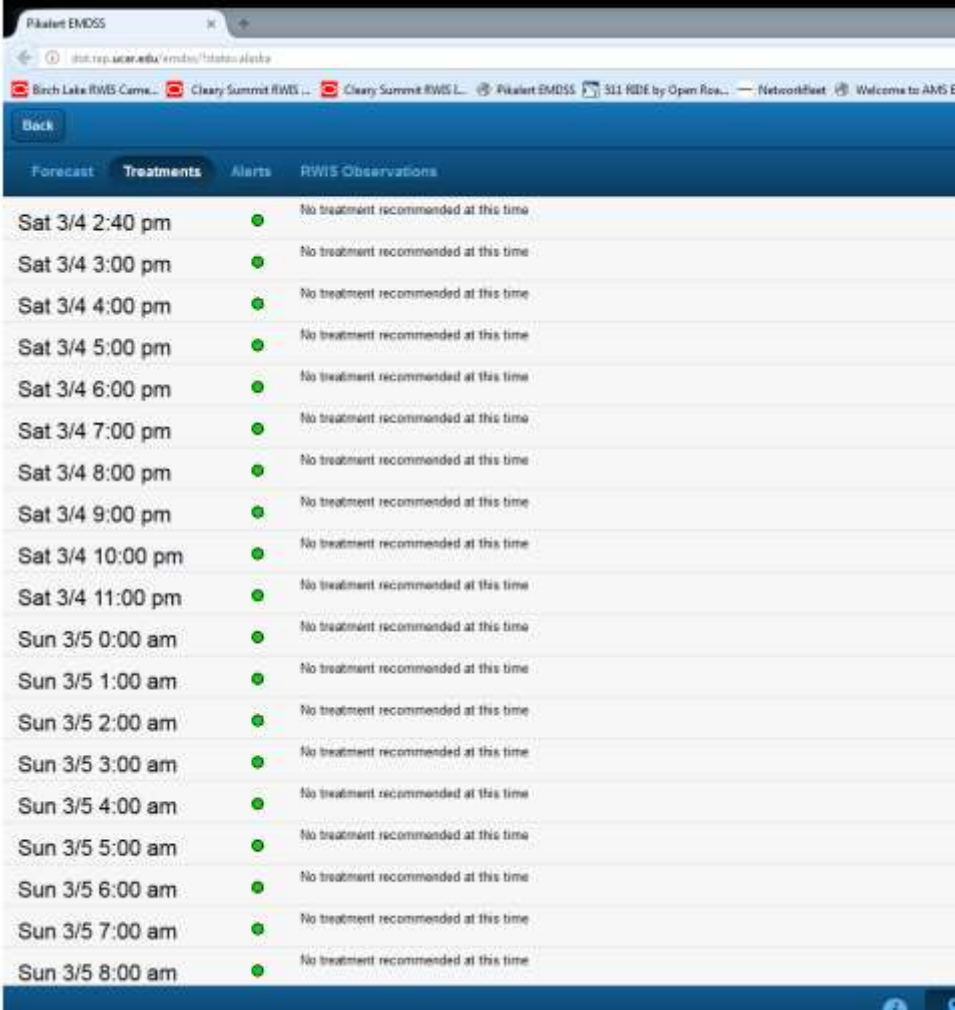
- Clear
- Advisory
- Warning

The screenshot shows a web browser window with the URL `dot.rap.ucar.edu/emdss/?state=alaska`. The page has a blue header with a 'Back' button and a navigation bar with tabs for 'Forecast', 'Treatments', 'Alerts', and 'RWIS Observations'. The 'Alerts' tab is selected. Below the tabs is a table with 10 rows, each representing a time slot on Saturday 3/4. The first row shows an 'Advisory' status (yellow dot) with details: 'Precip: none, Pavement: snow, Visibility: normal'. The remaining 9 rows show a 'Clear' status (green dot).

Time	Status	Details
Sat 3/4 2:40 pm	Advisory	Precip: none, Pavement: snow, Visibility: normal
Sat 3/4 3:00 pm	Clear	
Sat 3/4 4:00 pm	Clear	
Sat 3/4 5:00 pm	Clear	
Sat 3/4 6:00 pm	Clear	
Sat 3/4 7:00 pm	Clear	
Sat 3/4 8:00 pm	Clear	
Sat 3/4 9:00 pm	Clear	
Sat 3/4 10:00 pm	Clear	
Sat 3/4 11:00 pm	Clear	

# Enhanced Maintenance Decision Support System (EMDSS)

- **Recommended Treatments**
  - **No Treatment**
  - **Plow; Apply Abrasives**
  - **Plow; Apply Chemical**



The screenshot displays the Pikalet EMDSS web interface. The browser address bar shows the URL `dot.rep.akon.net/emi/101000/ak/aleka`. The page has a blue header with a 'Back' button and a navigation menu with tabs for 'Forecast', 'Treatments', 'Alerts', and 'RWIS Observations'. The 'Treatments' tab is active, showing a list of recommended treatments for different road segments. Each row includes a date and time, a green status indicator, and the text 'No treatment recommended at this time'.

Date/Time	Status	Recommendation
Sat 3/4 2:40 pm	●	No treatment recommended at this time
Sat 3/4 3:00 pm	●	No treatment recommended at this time
Sat 3/4 4:00 pm	●	No treatment recommended at this time
Sat 3/4 5:00 pm	●	No treatment recommended at this time
Sat 3/4 6:00 pm	●	No treatment recommended at this time
Sat 3/4 7:00 pm	●	No treatment recommended at this time
Sat 3/4 8:00 pm	●	No treatment recommended at this time
Sat 3/4 9:00 pm	●	No treatment recommended at this time
Sat 3/4 10:00 pm	●	No treatment recommended at this time
Sat 3/4 11:00 pm	●	No treatment recommended at this time
Sun 3/5 0:00 am	●	No treatment recommended at this time
Sun 3/5 1:00 am	●	No treatment recommended at this time
Sun 3/5 2:00 am	●	No treatment recommended at this time
Sun 3/5 3:00 am	●	No treatment recommended at this time
Sun 3/5 4:00 am	●	No treatment recommended at this time
Sun 3/5 5:00 am	●	No treatment recommended at this time
Sun 3/5 6:00 am	●	No treatment recommended at this time
Sun 3/5 7:00 am	●	No treatment recommended at this time
Sun 3/5 8:00 am	●	No treatment recommended at this time

# EMDSS Anti- Icing Support Factors



- **Weather Forecast**
  - EMDSS
  - National Weather Service
    - Forecast Discussion
    - Direct Link To Forecaster
    - iNWS
  - Weather Underground
- **Do We Have Time?**
- **Projected Duration Of Event**
- **What Will The Weather Be That Follows The Storm?**
- **Ground Temperatures**
  - Mobile Readings
  - Temperature Data Probes
  - Road Weather Information System (RWIS)

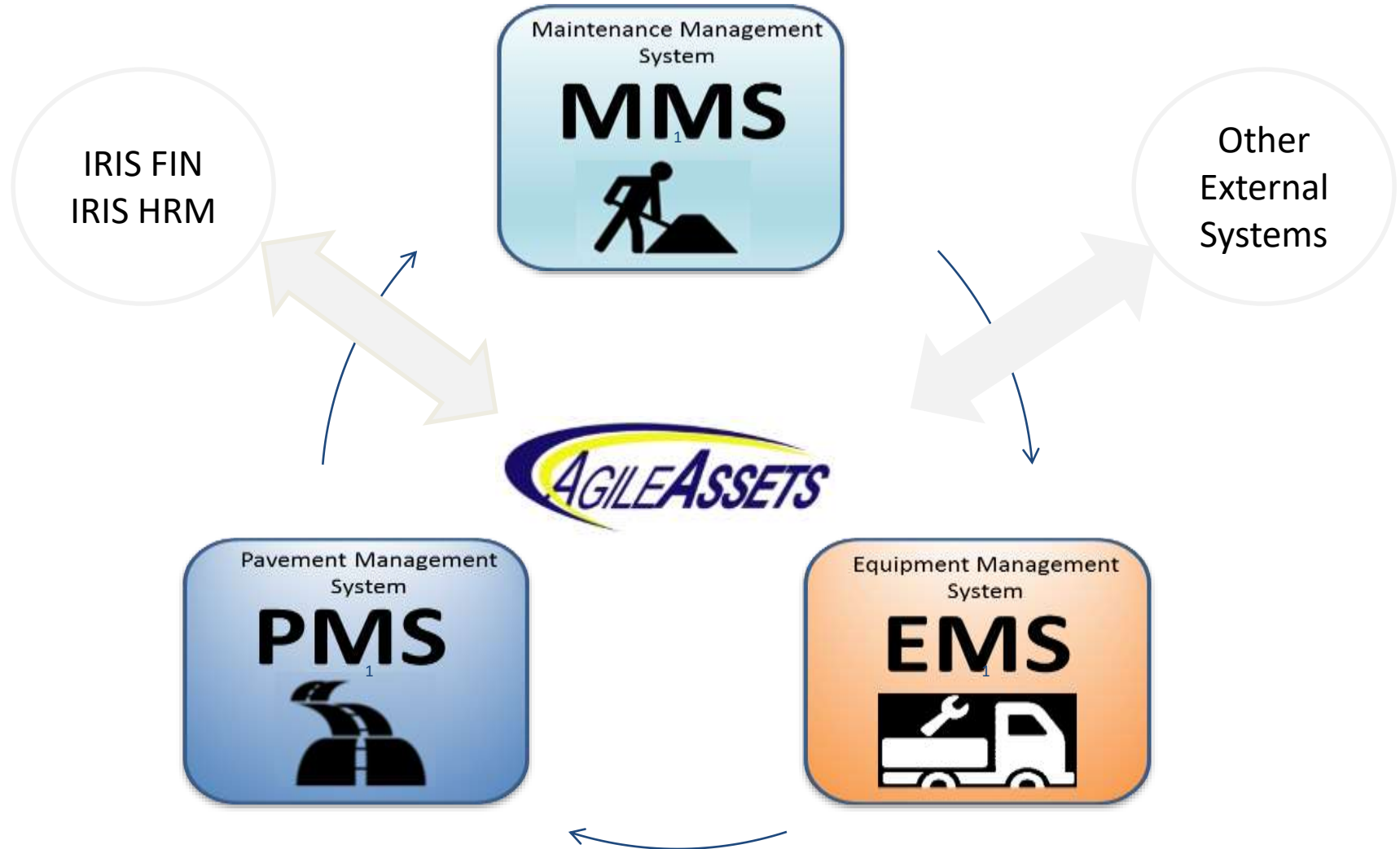




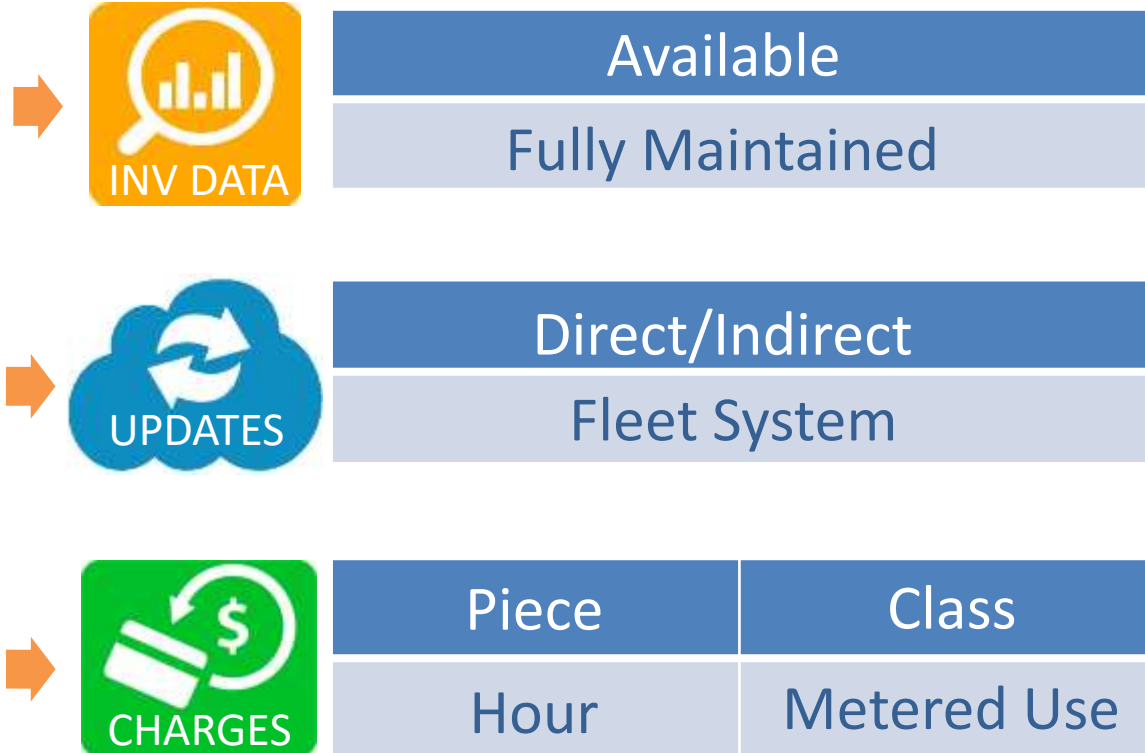
# New MMS

- Replace “legacy MMS” with AgileAssets  
MMS in a web based environment
- Replace Excel spreadsheets and disconnected applications with an “integrated solution”
- Introduce mobile apps

# AgileAssets Integrated Solution

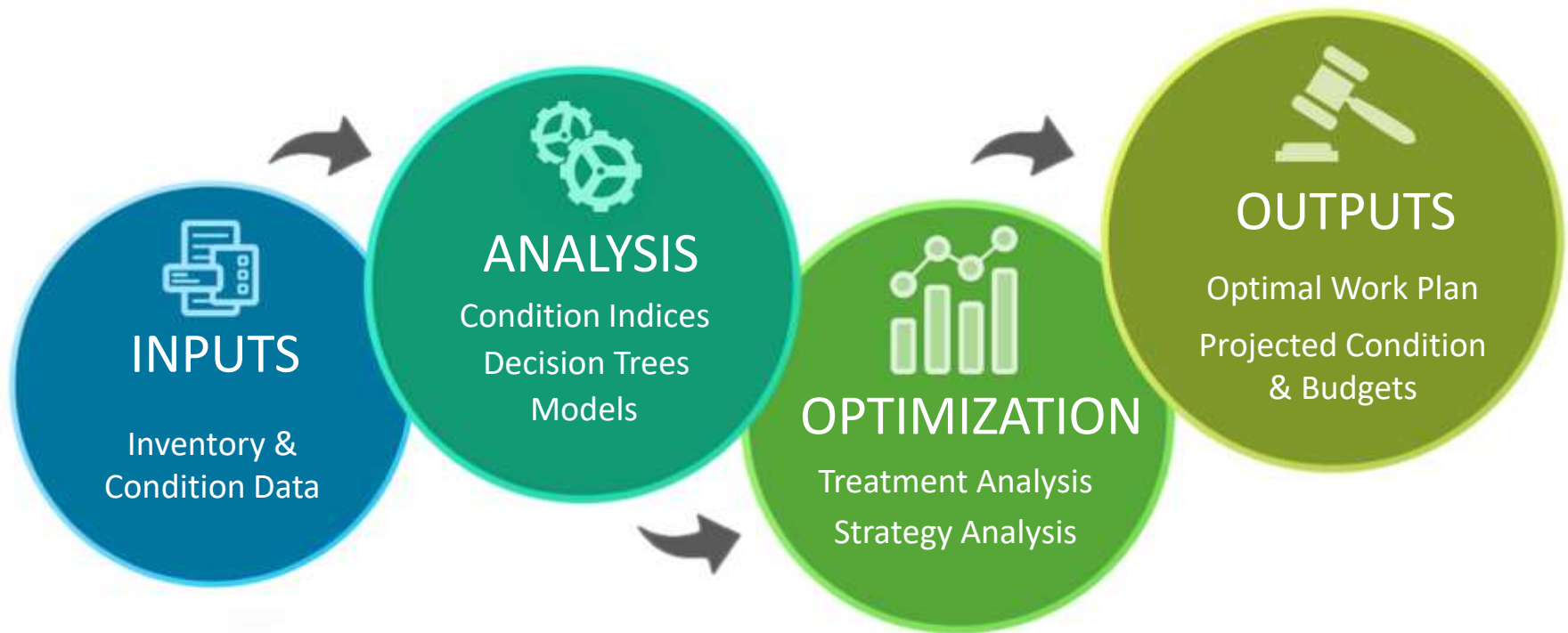


# Equipment Management System (EMS)





# Pavement Management System (PMS)



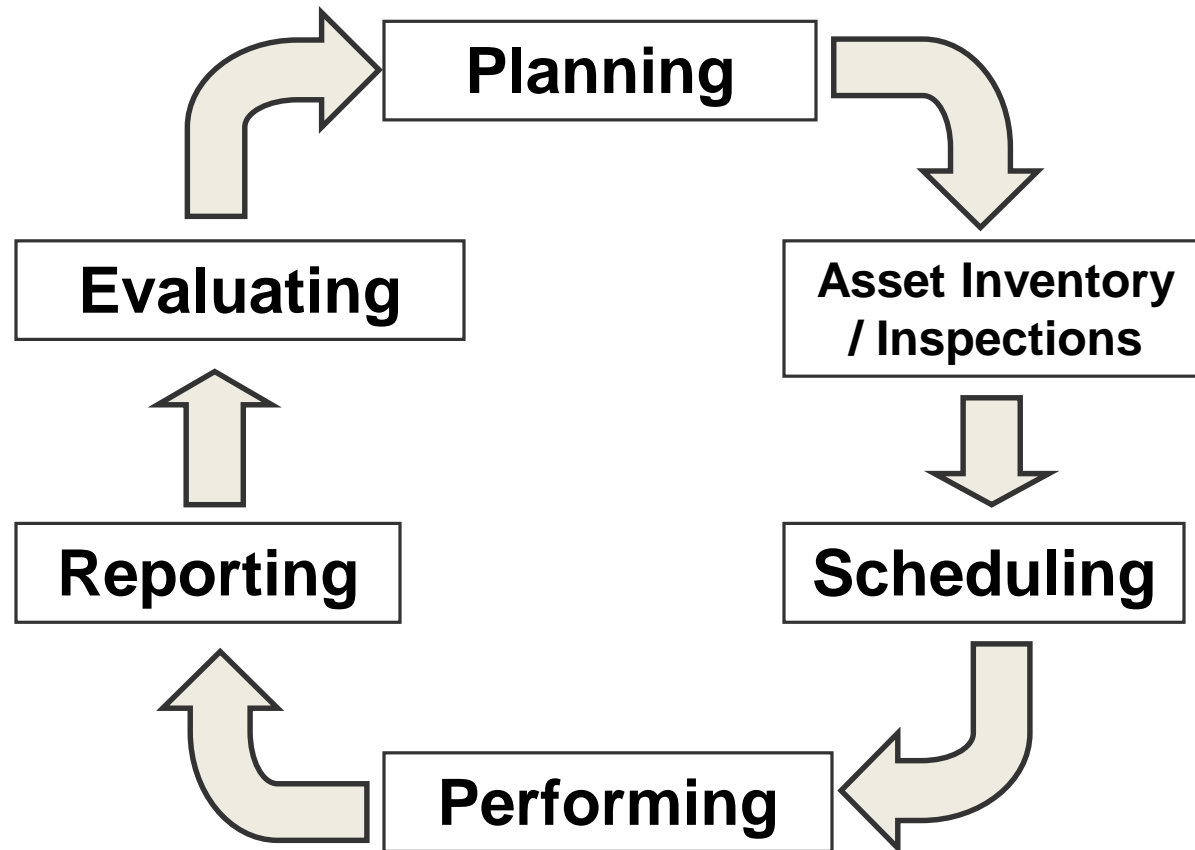
# AVL Integration

## Equipment Usage Integration

- ❖ MMS integration
  - ❖ Equipment meter usage
  - ❖ Update MMS equipment daycards
- ❖ Future EMS integration
  - ❖ Update meter readings and idle time



# MMS Phases & Efficiencies





# Asset Inventory and Inspections Efficiency

## Legacy

- Desktop Only
- Intranet-based

## New MMS

- Supports mobile apps – Esri Collector (mobile apps can work without internet)
- Can access application with an internet access “anywhere”



# Work Orders and Daily Work Report Efficiency

## Legacy

- Cannot edit after an incorrect entry
- Too many fields for user to input
- Intranet-based

## New MMS

- Create, Approve, Disapprove and Edit
- Minimize entry and reduce errors
- Mobile application – Mobile Work Manager



Mobile Work Manager





# Reporting: Efficiency

- Report down to
  - A road segment level
  - A specific location
- Report roll up to
  - A Station, District, Region or Statewide

Legacy	To-be MMS
<ul style="list-style-type: none"><li>• Request to pull data / report</li></ul>	<ul style="list-style-type: none"><li>• Users can build reports with no coding experience</li><li>• Can modify existing reports to suit individual needs</li></ul>
<ul style="list-style-type: none"><li>• Wait / processing time</li></ul>	<ul style="list-style-type: none"><li>• Very little to no processing time</li></ul>





# The “What-if” Plan

- Long term goal is to use “What-if” plan
  - Scenario analysis – Level of Service (LOS)
  - Currently QA/QC is major part of this
  - Funding based on planning forecasts and targeted LOS
- RBA
  - Measuring accomplishments
  - Analyzing results

Legacy	To-be MMS
<ul style="list-style-type: none"><li>• Linear approach from planning to maintenance</li></ul>	<ul style="list-style-type: none"><li>• Cycle approach from planning “through” maintenance</li></ul>
<ul style="list-style-type: none"><li>• Fixed funding</li></ul>	<ul style="list-style-type: none"><li>• Funding based on input from the cycle</li></ul>



# EMDSS & Agile MMS

# Questions?