

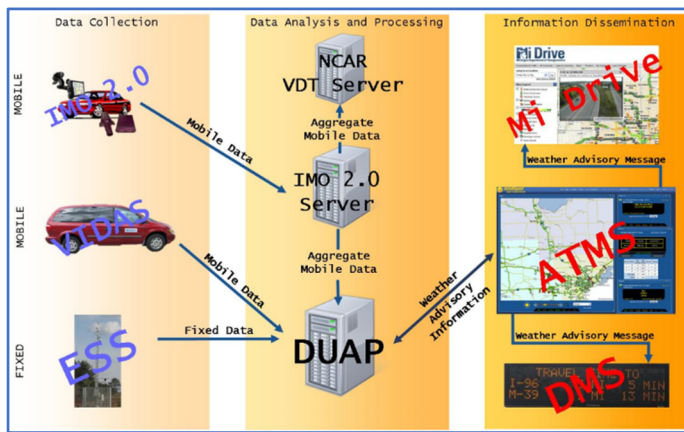


# Michigan Department of Transportation (MDOT) Weather Responsive Traveler Information (Wx-TINFO) System

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## Background and Objectives

FHWA's Road Weather Management Program partnered with MDOT to develop a weather responsive traveler information system called Wx-TINFO. The system, shown below, integrates multiple weather data sources into one program, enabling Transportation Operation Center (TOC) staff to provide near real-time weather-related advisories and alerts for travelers, thereby improving operating conditions during adverse weather conditions.



Wx-TINFO System Diagram (Source: MDOT)

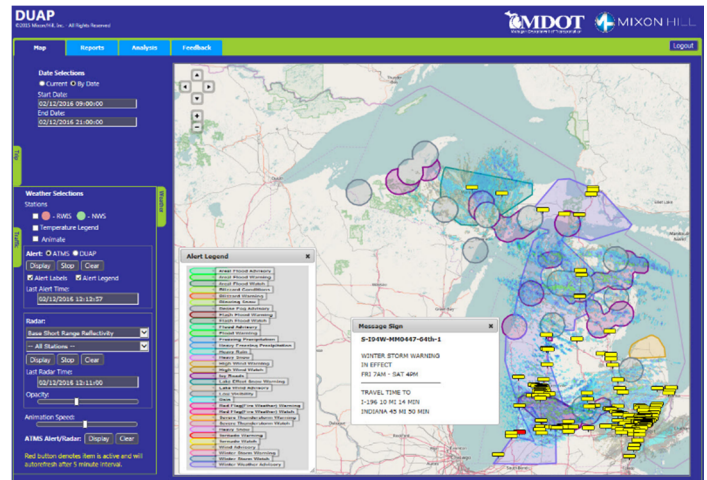
The primary goal of the Wx-TINFO project is to provide more accurate, timely, and effective messaging - aiding the traveling public in making informed travel decisions to improve safety and mobility. Specific objectives of the project included:

- ◆ Improve the real-time traffic management capabilities of MDOT TOC staff during weather events
- ◆ Improve the timeliness and content of road weather condition reporting updates to the traveling public
- ◆ Provide road weather condition information that MDOT Maintenance staff can use for road weather maintenance operations

## Wx-TINFO System Description

The information for the travel alerts is generated by the Wx-TINFO system, linked to dynamic message signs (DMSs) in the coverage area (see example below), and delivered to the ATMS automatically. The TOC Operators retain the ability to approve or override messages from the system if deemed necessary. Wx-TINFO has the following components.

- ◆ Data Ingestion/Data Sources
- ◆ Quality Assurance/Quality Control (QA/QC)
- ◆ Logic/Decision Tree Analysis
- ◆ Weather Event Creation
- ◆ Message Delivery



Wx-TINFO Weather Mapping Example (Source: MDOT)

The Wx-TINFO application was planned and designed with input from MDOT Operations personnel, who worked closely to develop the Concept of Operations. MDOT used the systems engineering process to rapidly develop the system and meet an aggressive project timeline. Working iteratively with subject matter experts, the team developed the system requirements. System testing was performed dynamically with MDOT Operations staff who provided feedback for further application iterations.

*"Anytime, Anywhere Road Weather Information"*

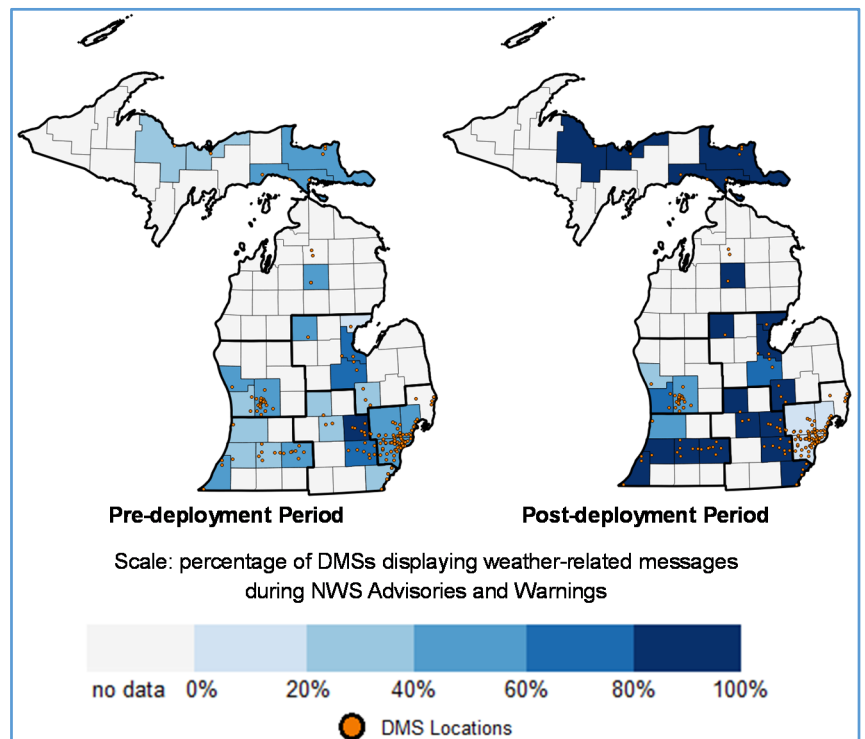
## Evaluation

The initial implementation of the Wx-TINFO system was evaluated to assess its effectiveness in improving TOC Operations and road traveler safety and mobility. The evaluation focused on three hypotheses associated with the objectives. The results show that the Wx-TINFO improved the traffic management capabilities of MDOT TOC staff during winter weather events and provided benefits to travelers. Specific evaluation results include:

1. The Wx-TINFO system improved the real-time traffic management capabilities of MDOT TOC staff during weather events:
  - ◆ During winter storm-related National Weather Service (NWS) advisories and warnings six of seven maintenance regions:
    - Increased the average number and percentage of DMSs displaying weather alerts (see maps at right)
    - Improved or maintained advance notification times on DMSs displaying weather alerts
  - ◆ A survey of TOC Operators showed about half had a favorable impression of the initial system, and adjustments were made using their feedback
2. The system improved the timeliness and content of road weather reporting updates to the public:
  - ◆ Mi Drive website visits increased by about 20%
  - ◆ User delay costs during NWS Advisory and Warning alerts decreased statewide: 25-67%
  - ◆ Traffic incident rates decreased in 2 regions, remained constant in 2 regions, and increased in 2 regions
  - ◆ Travelers responding to the web-based survey pertaining to weather-related DMS messages:
    - Familiar with DMS messages: 76%
    - Slowed down: 65-87%
    - Changed trip plans: 20-58%
3. MDOT Maintenance staff surveyed perceive road weather condition information valuable for future use. Potential benefits cited included improved accuracy and detail in road weather reporting from MDOT Maintenance staff during weather events.

## Future System Enhancement

The initial Wx-TINFO system has proven to be successful in fulfilling MDOT's project objectives—including integrating disparate fixed and mobile data sets and devising operations plans from those data. MDOT will continue enhancements to the Wx-TINFO system to improve weather responsive traffic management strategies in Michigan. Future Wx-TINFO system improvements may include adjustments to thresholds, increased automation, and the addition of other data sets to improve efficiency of weather-related messaging.



DMSs with Weather Messages during NWS Advisories and Warnings (Source: Battelle)

All other photos on this flyer, including the title banner, are courtesy of FHWA.

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