

# Integrating RWIS Data from Multiple Sources

tech transfer summary

## Objectives

The goal of the Road Weather Information System (RWIS) Integration project is to develop the means by which to integrate and share road and weather information. This will enable agencies to fully utilize all of the RWIS data that are potentially available to them. The project will achieve this goal through the following objectives:

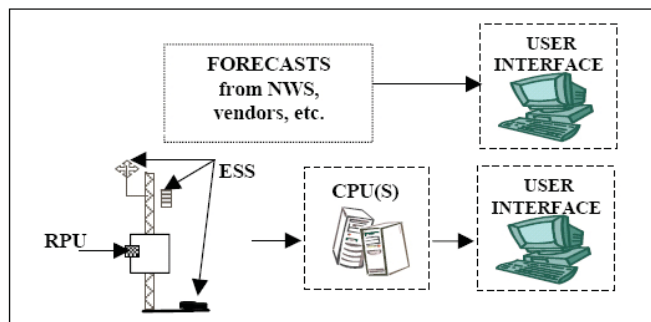
- Identify the level of data integration from different devices and agencies
- Identify any standard data format for integration
- Identify pertinent practices in RWIS integration
- Develop conceptual design guidelines for data exchange among various RWIS devices and agencies

## Problem Statement

Until recently, agencies deployed environmental sensory station (ESS) equipment and data collection procedures as independent, isolated systems, and little or no communication took place between jurisdictions or between sensors manufactured by different vendors. However, as agencies seek to expand their RWIS network and maximize the use of RWIS information, there is increased demand for data integration.

## Technology Description

RWIS combines technologies and decision-making techniques that use detailed historical and real-time weather information to improve the efficiency of highway maintenance operations and distribute effective real-time information to travelers. RWIS consists of three primary elements—ESS, forecasts, and information displays. The ESS consists of an array of environmental sensors that send weather and road surface data to the remote processing unit (RPU) nearby. The RPU sends information to a central processing unit (CPU) with applications that collect, disseminate, and archive RWIS data.



RWIS components

RESEARCH PROJECT TITLE  
Road Weather Information Systems (RWIS) Data Integration Guidelines

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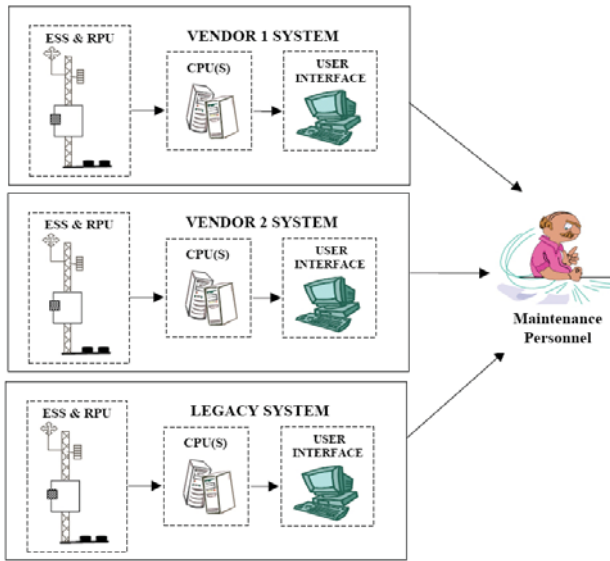
KEY WORDS  
RWIS—technology—data integration—information systems

ABOUT AURORA  
Aurora is an international partnership of public agencies performing joint research, evaluation, and deployment initiatives related to road weather information systems (RWIS).

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the project partners.

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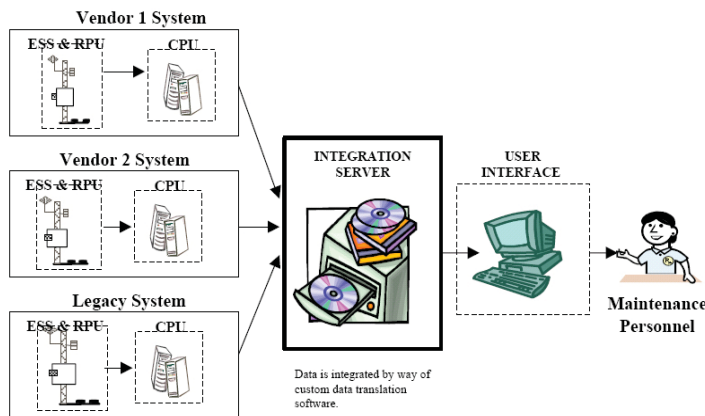
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Each RWIS vendor has its own proprietary system that cannot communicate with others. The result is that end users may have to interact with multiple user interfaces.

## Key Findings

It appears that integration at the database level using custom data formatting software is the most feasible option for RWIS data integration. The RWIS integration plan should allow information to feed from different vendors' hardware into one standardized system which will account for variances in data and can provide the data to other agencies and the general public. The National Transportation Communications for ITS Protocol (NTCIP) has developed a set of standards for RWIS at the database level.



Information feeds from the legacy system and each vendor system into one standardized system, so personnel can retrieve comparable data via one interface.

For agencies that wish to share their data, compliance with NTCIP-ESS Standards eases the process by providing an accepted format for sensor data. The standards are also helpful for agencies that are collecting data from sensors manufactured by different vendors. Several vendors are working on increasing their levels of standards-compliance, and it is hoped that these efforts will broaden the standards' acceptance.

## Implementation Benefits

By developing a program to integrate road and weather data, agencies can avoid "information overload," or the collection of duplicate data from multiple sources. Integration also eliminates the need for agencies to purchase and maintain separate systems. This will improve operations efficiency, decrease the amount of resources necessary to maintain a number of dissimilar systems, and ensure that personnel need only learn one user interface for data retrieval.

## Implementation Readiness

State agencies have identified several issues that need to be resolved in order to facilitate data integration:

- Data truncation – Concerns exist over some data being lost due to standardization efforts that truncate data.
- Communication costs – NTCIP may add overhead, increasing the size of the data packets and thus increasing file size and costs involved in retrieving data from ESS stations.
- Legacy systems – Measures should be developed to integrate data without costly upgrades or retrofitting of equipment.
- Proprietary issues – Vendors are reluctant to share their unique data formats with other vendors, which makes integration difficult.
- Firewall security – Since many agencies interested in sharing ESS statistics protect their data behind a firewall, solutions must be developed to allow information sharing without consequent loss of system security.
- Liability – There is debate regarding whether or not ESS data should be available to the public. On one hand, some feel that the public deserves access to accurate road and weather information; on the other hand, there is concern that users may misinterpret the data.