

# IMS RWIS

Road Weather Information System



*Road & weather  
data, forecasting,  
early warnings*

# IMS RWIS

## FEATURES:

- Road Weather Stations
- Flexibility - different sensors
- Data Acquisition Solution (UDCS)
- Database and Data Processing
- Fog and Ice Predictions
- Low Visibility Systems
- Real-time displays and early warning

The RWIS system consists of several components.

The in-field Automatic Road Weather Stations communicate with UDCS via GPRS (radio modem, TCP/IP,...). UDCS acquires the measured data. The data are processed by a quality control system and are stored in the database. The UDCS communicates over GTS with an external model and receives the weather forecast data, which are stored in the database, as well.

The database provides both measured data and forecast data to the fog and ice modeling software. The fog and ice modeling software computes the fog and ice predictions forecast and sends them to the database. The real-time displays are updated immediately as the data are acquired from the RWS. The operator on duty can directly see the actual situation in the field. The real time displays visualize the fog prediction forecast on the screen, as it is prepared by the fog (ice) modeling software.

The operator on duty is responsible for decision making and issuing of the control commands to the road sign boards. The operator's decision is based on information provided by the real-time display and procedures approved by the local authorities.

The road sign boards can be updated automatically with the actual notification regarding the measured visibility or other meteorological phenomena.

## Measurement

The system can interface numerous types of data-loggers and sensors. It is designed to measure, calculate, and process different meteorological quantities as temperature (air, road), wind speed and direction, atmospheric pressure, relative humidity, precipitation (indicator and amount), visibility, road condition (ice, snow, wet, dry), freezing point, and is open to adjust for measuring and processing of other quantities, if needed.

The measurement module offers:

- Interfaces for the various sensors and data loggers:
- RS232 / RS422 / RS485, TCP/IP (http, ftp and telnet protocols)
- Data collection based on TCP/IP network and/or RS lines, radio, USB
- Numerous input data formats supported (raw text/binary, XML),
- Data input based on Plain2XML convertors
- Quality control, verification of measured data, format validation
- Real-time weather displays, web screens

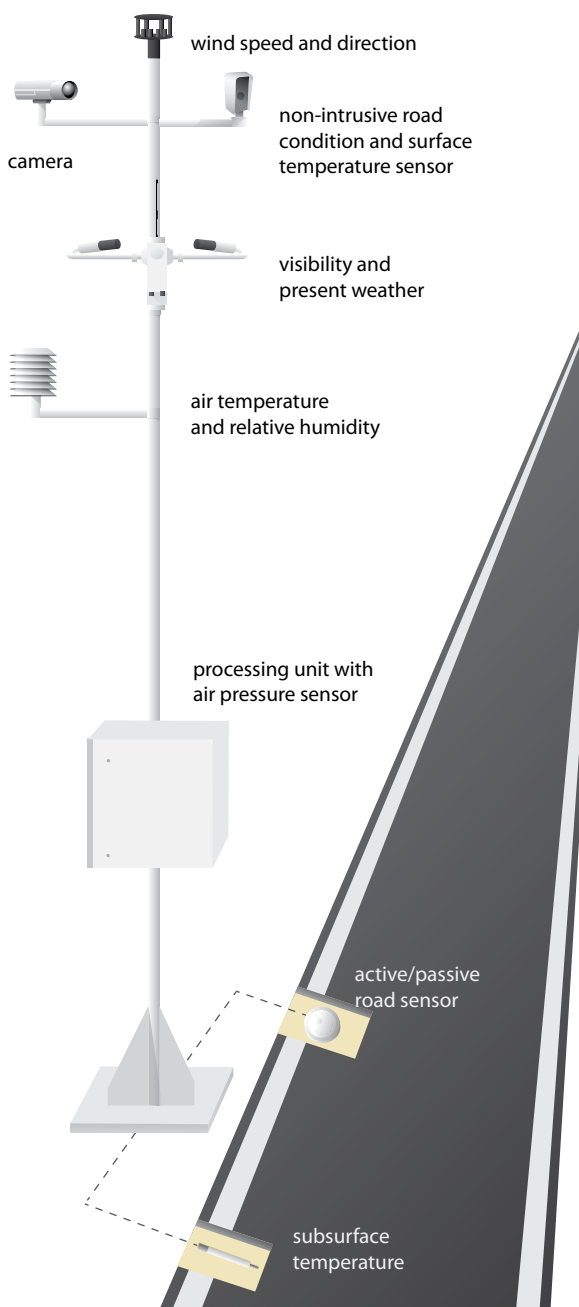
# IMS RWIS

## System description

The automatic road weather station provides ground-truth data acquired in-field on the road. The data are displayed on the real time displays. The ground measured data are used as input for the fog (ice) forecasting model, improving the results of the model.

The automatic weather station consists of several parts

- Data-logger
- Sensors
- Meteorological mast
- Accessories



## Field Sensors

The typical set of field sensors consists of:

- Wind speed and direction sensors
- Pressure sensors
- Temperature and relative humidity sensors
- Visibility and present weather sensors
- Soil temperature and soil moisture sensors
- Camera

Intrusive pavement sensors:

- Intelligent Road Surface Condition Sensor: surface and underground temperature, salt concentration, freezing temperature, water film height, road condition
- Active/passive road sensors

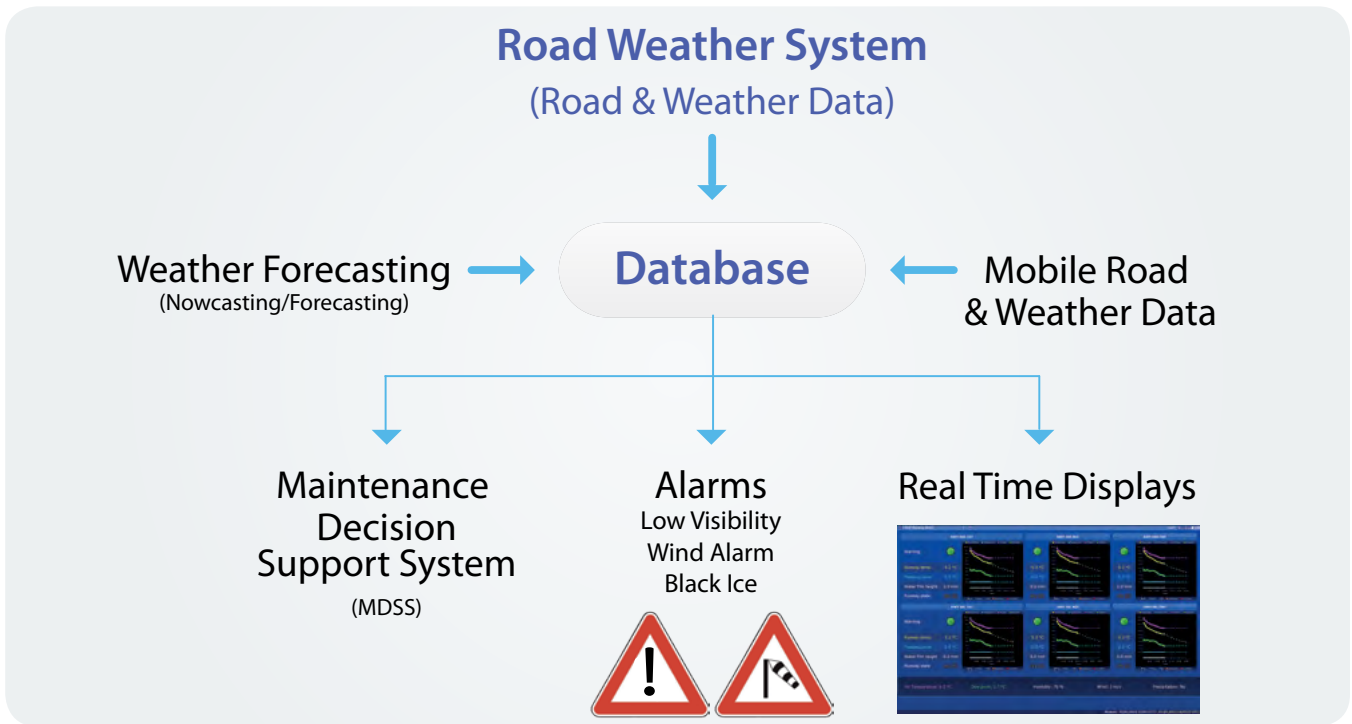
Non-intrusive pavement sensors:

- Surface temperature
- Road condition



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## System description



### Modeling and Forecasting

The fog and ice forecasting models provide the local visibility forecast and prediction of the ice frost.

Although the fog (ice) model cannot prevent the weather conditions, it provides early warning on possible formation of water fog (ice frost). The models are to be taken as early warning to sharpen attention of the operators.

### Real-Time Display

The real-time display is a collection of screens installed in the central office. Its main purpose is to display the real-time data acquired from the in-field AWS, to visualize the fog (ice) prediction, as well as the current condition of the road, from the model output. It shall be used by operators on duty to support the decision-making process and to enable early warnings.

### Alarms

IMS Road System allows to configure rich set of alarms including:

- Diagnostics of datalogger and sensor errors
- Quality control of measured data (limits, internal consistency)
- Operational alarms (user-defined thresholds and limits)
- Communication errors



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