



A SOLUTIONS GUIDE FOR
ROAD WEATHER INFORMATION SYSTEMS

Smart Solutions for Road Weather and Flooded Roadway Risks

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Introduction

Weather-related hazards on the road pose a severe threat to public safety, accounting for over 418,000 injuries and 5,700 deaths annually. Road weather solutions monitor conditions in real time and alert local motorists and emergency personnel when dangerous situations develop to mitigate risk.

ANNUAL WEATHER IMPACT AT A GLANCE:



418k
Injuries



544M
Hours of
traffic delays



5,700
Deaths

IMPACTS OF WEATHER:

Road weather impacts traffic flow and overall roadway operations, with wet pavement representing the most common hazard. 75% of weather-related accidents every year are due to wet pavement or rain. Other weather conditions such as snow, ice, and fog can result in similar consequences if roads are not monitored and motorists are not warned of the dangerous conditions.

Hazardous weather of these types often results in road closures, traffic build-up, and other slowdowns. On freeways, light rain or snow can decrease average motorist speeds by 3% to 13%, heavy rain can decrease average speeds by 3% to 16%, and heavy snow can decrease average speeds by 5% to 40%. When weather events are severe or long enough, they can lead to lane, road, or intersection closures. Flooding, snow obstruction, and wind-blown debris also present major challenges. Overall, snow, ice, and fog make up 23% of non-recurrent delays on highways, or 544 million hours of delays every year.¹

¹ https://ops.fhwa.dot.gov/weather/q1_roadimpact.htm (Federal Highway Administration)





COSTS OF ROAD WEATHER:

Severe weather may drive up costs of maintenance and operations, which accounts for around 20% of state Department of Transportation maintenance budgets yearly. 70% of the United States population and roadways are in cold regions that encounter more than five inches of snow a year, meaning more hazardous road conditions and a higher risk of motorist accidents, according to the Federal Highway Administration.

WHY IMPLEMENT A ROAD WEATHER SOLUTION?

Weather can impact roads very quickly, so having real-time data collection and warning systems is important for increasing public safety. Road weather solutions alert both emergency management personnel and motorists in real time. Warnings may include flashing signs or flood gates that warn motorists of the hazard or deter them completely, depending on the situation. Road weather solutions can help increase awareness of hazardous weather conditions on the road in real time, decreasing the risk of accidents in the area.

Anyone responsible for a road impacted by weather, such as Department of Transportation, Ministry of Transport, and Public Works agencies, at either the city or state level, can benefit from road weather solutions. Roadways that experience routine flooding and icing conditions are ideal places to set up warning systems to protect motorists from hazardous conditions. Many accidents occur when motorists are not aware of dangerous roadway conditions, so implementing an efficient warning system is important to keeping motorists safe and aware.



Road weather systems—How they work

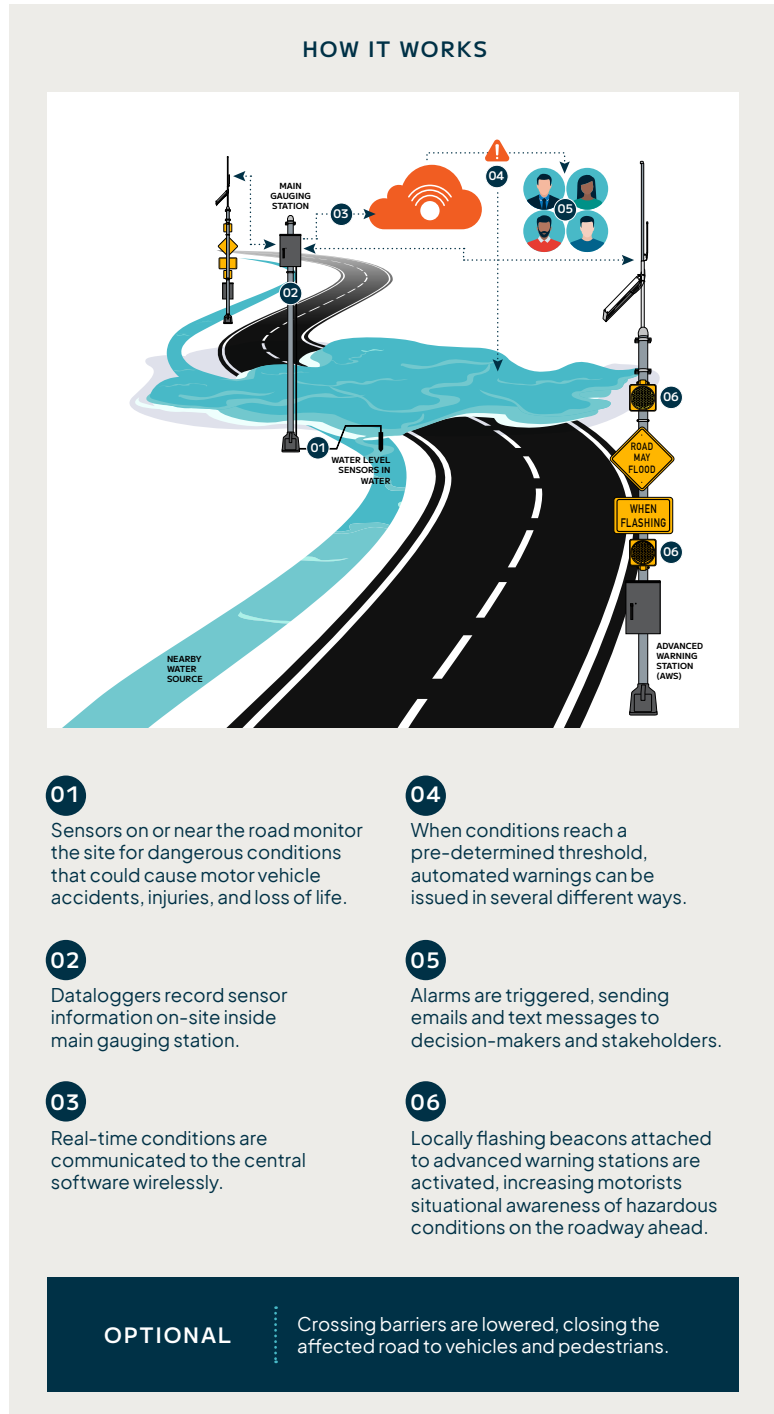
There are two types of Road Weather Systems that this guide will cover.

1 ROAD WEATHER INFORMATION SYSTEMS (RWIS)

Road weather information systems typically measure three types of road weather information: **pavement-level data**, **atmospheric data**, and **water level data**. Pavement-level data can include surface temperature, subsurface temperature, road condition (dry, damp, wet, snow, ice), and friction coefficient (good, fair, or poor grip). It is important to consider current weather conditions when determining road safety, which is why the best road weather systems incorporate atmospheric data such as air temperature, relative humidity, wind, and precipitation information, among others. Present weather conditions such as limited visibility due to fog, rain, snow, and freezing precipitation are also measured.

2 FLOODED ROADWAY SYSTEMS

Flooded road warning systems measure water level, which makes them ideal for places where roads experience frequent flooding due to high rates of rain or proximity to bodies of water. Sensors can also be placed in neighbouring streams, lakes, and rivers to monitor water levels before road flooding occurs.



Factors to consider when choosing RWIS or Flooded Roadway Systems

Ensuring you get the right system for you



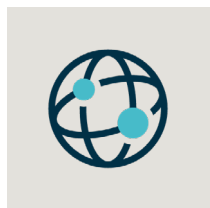
1. SIZE OF COVERAGE AREA

The first factor to consider when choosing a road weather system is the size of the area you want to cover. For large municipalities, consider a network approach, with road weather systems connected to a central hub where multiple sites can be monitored simultaneously from remote locations. If you're covering a smaller area, such as a single unit installation, there are simpler options.



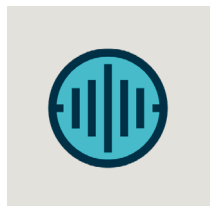
2. EASE OF INSTALLATION

There are many choices when it comes to road weather systems. Do you need embedded road sensors, or will infrared sensors that do not require in-pavement sensing suffice? Naturally, in-pavement sensors are more expensive to install and maintain, but in high-needs areas, they have a greater impact.



3. CONNECTIVITY

Network-based solutions with integrated cellular communication send system data and status to centralized software so that real-time conditions can be visualized and tracked on a map interface. At the same time, driver warning devices such as beacons, signage, and barriers are activated without outside communication.



4. COMMUNICATIONS

NTCIP communications enable road weather systems to integrate seamlessly with existing Intelligent Transportation Systems (ITS) and offer a non-proprietary, open architecture design that allows maximum flexibility in choosing road weather sensors and telemetry options.

With two-way communications you can reduce trips to the site with the ability to override system beacons remotely from software.





5. POWER

Road weather solutions should be self-sufficient with solar power and battery backup for data continuity. If there is a loss of power, onsite battery back-up enables data storage during outages.



6. ALERTS AND WARNINGS

Email and text alerts are sent to decision-makers when road conditions deteriorate. Notifications sent directly to mobile phones, tablets, and desktop computers increase public safety and improve emergency response times.



7. HISTORICAL DATA

For post-event analysis and trend forecasting, historical road weather conditions are a must. Local dataloggers ensure that historical data can be downloaded in case of loss of communications.



8. COMMUNICATIONS

Road weather systems should be backed by a skilled technical support team if issues arise. An effective technical support setup should include onboarding and regular training for users, as well as access to field technicians who will travel for routine and emergency onsite troubleshooting and maintenance.



Use cases for road weather applications



1. COLD WEATHER FOR ROADS AND BRIDGES

When cold weather arrives, roads are particularly vulnerable to humidity, freezing temperatures, and winter storm events.

Bridges and overpasses tend to freeze before roadways because air circulates above and below the deck of the bridge, rapidly lowering the temperature of the pavement.

2. VISIBILITY FOR ROADS BRIDGES, AND TUNNELS

Many weather conditions, including rain, fog, snow, and sleet can reduce visibility, creating hazards for motorists.



3. PRESENT WEATHER CONDITIONS

Storms can lead to dangerous crosswinds on bridges and elevated roadways. High heat can make pavement buckle. When unsafe conditions develop, sensors send notifications that enable real-time decision-making.



4. FLOODING AT LOW WATER CROSSINGS

About half of all flash flood fatalities are vehicle related. Low water crossings are low points in a road that regularly experience flooding and can be washed out during heavy rains.

5. MOBILE ROAD SENSORS

Road Anti-icing, Pre-treatment, and De-icing
Road Weather Systems are key to effectively managing pavement treatment programs during winter weather. Mobile sensors mounted on a vehicle or snowplow monitor surface and air temperatures in real time and present that information on an in-cab display unit or vehicle controller. The output can be used to aid in decision-making around road pre-treatment and deicing strategy.

Broadcasters and Storm Chasers

For those headed into dangerous weather, a mobile sensor suite can provide up-to-the-minute information to aid in traffic reports, forecast reports, and more.



6. AIRPORTS AND RUNWAYS

For winter airport operations, RWIS can be used to help with maintenance not only on runways, but also on aprons, taxiways, and public-facing areas of the facility such as terminal roads, parking areas, and pedestrian walkways.

Road Weather Systems configurations

AEM's [High Sierra Electronics](#) brand, a leader in RWIS and flooded roadway systems, has the right solutions to help you manage road weather. Whether it's icy roads, high winds, or flooded roadways, the StormLink® family of solutions has you covered.

STORMLINK RWIS PRO

StormLink RWIS Pro is a fully customizable Road Weather Information System for large counties and cities that need a robust solution for road weather alerting. StormLink RWIS Pro is fully NTCIP compliant and monitors extensive pavement and atmospheric measurements.

The solution includes the [StormLink RWIS datalogger](#), which provides an open architecture NTCIP-compliant platform. It's designed for reliability and accuracy in harsh conditions. Sensor inputs and outputs are surge protected, allowing the system to recover and decrease necessary maintenance visits. It runs on low power and can be solar powered, but a battery is included for backup operations.

WHERE USED

- Bridges and overpasses
- Freeway exit and entrance ramps
- Elevated roads
- Highways and surface streets
- Curved and shaded areas of a road
- Risk zones in open plains and on exposed highways
- Airport and runway surfaces



BENEFITS

- NTCIP-compliant communications
- Flexible deployment options with a full range of atmospheric and road sensors including in-pavement and non-intrusive
- Robust and reliable, featuring the latest in datalogger technology
- Automatic and accurate detection of hazardous roadways

PARAMETERS MEASURED

- Air Temperature
- Relative Humidity
- Wind Speed
- Wind Direction
- Precipitation Type
- Precipitation Amount
- Precipitation Rate
- Precipitation Start/End Time
- Visibility
- Barometric Pressure
- Pavement Measurements
- Surface Temperature
- Surface Condition
- Surface Friction/Grip
- Subsurface Temperature
- Water Level

STORMLINK RWIS ONE

StormLink RWIS One is a flexible Road Weather Information System for large to small municipalities that need a middle tier solution for road weather alerting. StormLink RWIS One is an industrial system where sensors and locations can be customized to fit specific needs of the area.



BENEFITS

- Integrated cellular communication sends system data and status to software to better manage the roadway and reduce maintenance costs
- Local data logging allows past system data to be downloaded locally if communication failed
- No outside communication needed to activate the warning system

PARAMETERS MEASURED

- Icy Road
- Winter Conditions
- Low Friction
- Low Visibility
- High Wind
- High Water

STORMLINK RWIS LITE ICY ROAD

StormLink RWIS Lite Icy Road is a cost-efficient, packaged system for small cities with less-traveled roads that need a basic driver warning system. This low-power wireless system measures road conditions related to icing to trigger real-time alerts for approaching motorists. This system will warn motorists of icy roads ahead so that they have time to slow down and take necessary precautions.

The solution includes a control station made up of the Surface Sentinel sensor that issues alerts when there are icy road conditions present. The warning station contains highly visible LED lights to warn drivers of hazardous conditions before they encounter them. Data from the sensors is sent to the Contrail® software platform so it can be visualized and sent to agency personnel. Wireless communications between the Control Station and Warning Stations eliminates the need for outside communications. All parts of the system are solar-powered, allowing for a low-power solution that can be easily installed on existing infrastructure.



PACKAGED SOLUTION

Control Station	Surface Sentinel with sensor node, cellular gateway, battery enclosure, and solar panel
Warning Station (2x)	36-inch warning road sign, 12-inch beacon, output node, battery
Data Services	Package includes first year cellular data and Contrail Connect software service

WHERE USED

- Bridges and overpasses
- Freeway exit and entrance ramps
- Elevated roads
- Highways and surface streets
- Curved and shaded areas of a road
- Risk zones in open plains and on exposed highways
- Airport and runway surfaces

BENEFITS

- Reduces accidents in key areas by warning drivers when dangerous conditions are present
- Utilizes tried-and-tested hardware for a robust and integrated package
- Automatically sends data to central software for visualization and notifies relevant agency personnel as needed

PARAMETERS MEASURED

- Surface Temperature
- Air Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure

StormLink RWIS Icy Road Warning Systems features matrix

FEATURES	KEY BENEFITS	STORMLINK RWIS LITE	STORMLINK RWIS ONE	STORMLINK RWIS PRO
Warn drivers of potentially icy roads	Reduce accidents by warning drivers with automated flashing beacons to slow down when weather hazards exist.	✓	✓	✓
Integrated cellular communication sends system data and status to software	Increase situational awareness to better manage the roadway and reduce maintenance costs.	✓	✓	✓
No outside communications needed to activate the warning system	Improve driver safety by letting the traveling public know of weather hazards when they happen	✓	✓	✓
Solar powered	Get the system up and running quickly with simple installation	✓	✓	✓
Email and text alerts of system status	Address weather issues quickly and increase public safety with notifications of system status directly to any device	✓	✓	✓
Two-way communications	Reduce trips to the site with the ability to override the system beacons remotely from software	✓		✓
Remote system configuration	Reduce trips to the site by adjusting system thresholds and configurations remotely from software	✓		✓
Local data logging	Past system data can be downloaded locally in communication failed		✓	✓
NTCIP open communications protocol	Easily expand the system with any compatible systems and software suites			✓
Complete RWIS sensor suite	Increase situational awareness by collecting data from a full suite of road weather sensors for additional alarming capabilities and weather information			✓
Ethernet and serial output	Flexible communication options with third-party equipment and existing infrastructure			✓



StormLink RWIS Icy Road Warning Systems features matrix

COMPATIBLE WARNING TYPES:	METHOD OF MEASUREMENT	STORMLINK RWIS LITE	STORMLINK RWIS ONE	STORMLINK RWIS PRO
Icy road potential	Icy road potential is calculated by measuring surface temperature, air temperature, and relative humidity measurements with the Model 5439 Surface Sentinel	✓	✓	✓
High wind warning	High wind speed measured with the Model 5712 Mechanical and Model 5714 Ultrasonic Anemometers		✓	✓
Low visibility or fog	Low visibility measured with the Model 5434 Visibility Sensor or the Model 5432 Present Weather Sensor			✓
Winter road condition or friction measurement	Winter road conditions or low friction from a direct measurement with laser technology with the Model 5433 IceSight™			✓

MOBILE ROAD SENSORS FOR VEHICLES

Vehicle-mounted mobile weather sensors assess road weather conditions in real-time from a moving vehicle. These devices are designed for harsh conditions and manufactured exclusively in the U.S. by [High Sierra Electronics](#), an AEM brand.



BENEFITS

- Expand the coverage and capabilities of existing fixed road weather stations at a lower cost
- Receive real-time road surface and atmospheric data where and when you need it
- Up-to-the-minute geolocation of information for maintenance operations timely decision making
- Enable decision-makers to quickly target road surface treatments and reduce costs

PARAMETERS MEASURED

- Road Conditions (dry, damp, wet, snow, ice)
- Air Temperature
- Relative Humidity
- Surface Temperature
- Friction Coefficient (good, fair, or poor grip)

MOBILE SURFACE SENTINEL

Real-time surface and air temperature

Mobile Surface Sentinel is a precision instrument that provides surface temperature and air temperature in real time from a moving vehicle to an in-cab display unit. Connecting wirelessly to the Mobile Display Unit (MDU) for simple installation, the Mobile Surface Sentinel detects and alerts vehicle operators of possible freezing conditions.



FEATURES

- Industry-leading rapid response time to changing air and surface temperatures
- Simple installations with multiple mounting options, typically mounted on the front bumper or mirror of the vehicle
- High-accuracy infrared road temperature and air temperature sensors
- Low-power: power is the only connection required for the wireless unit and connects directly to the vehicle battery
- The optional serial unit integrates with Automated Vehicle Locator (AVL) solutions for real-time weather data and fleet management treatments to reduce costs



MOBILE ICESIGHT

Real-time hazardous icy road & snow conditions detected

Mobile IceSight is an RWIS mobile surface condition sensor that provides real-time surface weather condition of roadways. It uses infrared technology to detect hazardous ice, snow, or wet conditions without embedding any sensors in the pavement.



FEATURES

- Uses laser and infrared electro-optical technology to detect hazardous ice, snow and wet conditions with a surface grip value without embedding any sensors in the pavement
- Surface states reported include dry, damp, wet, slush, snow and ice. Surface grip is reported as a friction coefficient on a scale of 0 (worst) to 1 (best) and in simple terms to the motorist as good, fair, or poor
- Road temperature is measured by an accurate non-contact infrared temperature sensor
- Air temperature and relative humidity are measured separate from the main sensor housing to allow for accurate readings with quick response time to changing atmospheric conditions

High water detection systems for flooded roadway configurations

Heavy or sustained rainfall events can result in rapidly rising water and flash flooding with little or no warning. Some typical problem sites include:

- Low water crossings
- Areas prone to coastal flooding
- Underpasses
- Urban areas where drains exceed their capacity

STORMLINK RWIS LITE HIGH WATER DETECTION SYSTEM

StormLink RWIS Lite High Water Detection System is a cost-efficient, packaged system for small cities with nuisance flooding or on less-traveled roads that need a basic driver warning system. This solar powered, wireless system measures water levels at low points in the road and alerts surrounding motorists when flooding conditions are present.

The packaged system includes a Control Station that measures the flood hazard, and two Warning Stations on each side of the hazard to warn motorists. The Control Station measures the water level at the low point of the road and provides intelligent alarming when roadway flooding is occurring. Highly visible flashing LED lights at the Warning Station alert drivers to slow down, or turn around, before approaching the hazard. Communication between the Control and Warning Stations is wireless and fully autonomous allowing the system to automatically function without outside communication commands. All parts of the system are solar-powered, allowing for a low-power solution that can be easily installed on new and existing infrastructure. A cellular gateway sends data from the warning system to the Contrail software which provides data visualization, system configuration and customized alerting for agency personnel. Contrail retains a historic record of all system data and can provide the hydrograph of storm events and a record of system activation.



PACKAGED SOLUTION	
Control Station	Pressure Transducer with sensor node and cellular gateway
Warning Station (x2)	36-inch warning road sign, 12-inch beacon, output node, battery enclosure, and solar panel
Data Services	Package includes first year cellular data and Contrail Connect software service

BENEFITS

- Reduces accidents and keeps the public safe by warning drivers of flooded roadways
- Utilizes tried-and-tested hardware for a robust and integrated package
- Automatically sends data to software for visualization and generates notifications for relevant agency personnel

PARAMETERS MEASURED

- Water level

STORMLINK RWIS PRO HIGH WATER DETECTION SYSTEM

Advanced features and options make this suitable for life-threatening flood-prone streets and high-volume principal roadways where additional sensors, cameras, and two-way barrier gates may be employed.

The StormLink RWIS 2-Way ALERT2 High Water Detection System is a complete 2-way ALERT2 roadside warning system that integrates with existing ALERT2 Flood Warning Systems. The StormLink Roadway Advance Flood Warning Systems are generally made up of one master – Model 3482-02 to monitor the water level at your roadway monitoring site and up to eight remote stations – Model 3480-02 with a 3580 Series – Flashing Beacon Controller to advise motorists of an impaired or flooded roadway by activating flashing lights or an automatic road crossing-arm barrier.



BENEFITS

- Detect and monitor real-time rising water conditions around the clock
- Activate flashing beacons and warning message signs
- Stop vehicles driving through flood with automatic road barrier gates
- Send automatic alerts and detailed notifications to key personnel and emergency responders
- Publicly display real-time road hazard and closure data on the web
- ALERT2 open communications protocol allows for easy integration with compatible systems

PARAMETERS MEASURED

- Water level
- Optional rainfall
- Optional full weather station with array of meteorological sensors



PACKAGED SOLUTION	
Master Station	The master station typically includes one or a pair of water level sensors, a microprocessor based controller system housed in a locking aluminium cabinet, an aluminium mounting pole with a DOT-approved breakaway base and anchor, a 20-watt solar panel, battery, lightning protection, and a 3dB omni-directional antenna.
Remote Station	The remote station typically includes a microprocessor-based controller system housed in a locking aluminium cabinet, an aluminium mounting pole with a DOT-approved breakaway base and anchor, two 12-inch (30.5 cm) diameter yellow LED beacon signals, a 20-watt solar panel, battery, lightning protection, a 3dB omni-directional antenna or High Gain Directional Antenna, and hardware necessary for attaching a 48-inch (121.9 cm) warning sign.
Controller System	The controller system for the HWDS combines several pieces of equipment including the Hydromet Data Logger/Controller – Model 3512-00 , radio, Model 7200-00 Antenna Lightning Protection Device , and either the 5310 Solar Panel Voltage Regulator or the Maximum Power Point Tracking Solar Charger & Load Control – Model 5315-01 .



StormLink RWIS HWDS features matrix

FEATURES	KEY BENEFITS	STORMLINK RWIS LITE HWDS	STORMLINK RWIS PRO HWDS
Warn drivers of water over the road	Reduce accidents by warning drivers to turn around and avoid water over the road.	✓	✓
Water level measurement with Pressure Transducer	Increase situational awareness by knowing the depth of water over the roadway and deploying resources accordingly.	✓	✓
Integrated cellular communication sends system data and status to software	Remotely collect data from anywhere there is a cellular signal. Requires a cellular connection for data collection.	✓	Optional
Integrated cellular communication sends system data and status to software	Improve driver safety by letting the traveling public know of weather hazards when they happen.	✓	✓
No outside communication needed to activate system	Improve driver safety by letting the traveling public know of weather hazards when they happen.	✓	✓
Solar-powered	Get the system up and running quickly with simple installation.	✓	✓
Two-way communications	Reduce trips to the site with the ability to override the system beacons remotely from software.	✓	✓
Email and text alerts of system status	Address weather issues quickly and increase public safety with notifications of system status directly to any device.	✓	✓
Remotely trigger barrier gates to close road when water is present over the road	Increase public safety by automatically closing the road with a barrier gate when water is over the road.		✓
High resolution of water level	The pressure transducer sensor has a higher resolution for fine measurement of water level.		✓
Advanced measurement configurations	Increase the robustness of the HWDS by providing backup or redundant sensors with sensor voting.		✓
ALERT2 open communications protocol	Easily expand the system with any compatible systems and software suites.		✓
Long range wireless communications	Flexible installation using VHF communications that allow for long range communications even without direct line of sight.		✓
Centralized communication system	Secure data transmissions with radios that provide an encrypted, closed loop communication system from end to end.		✓
Local data logging	Past system data can be downloaded locally if communication failed.		✓
Measure flashing beacon current	Know that the system beacons are flashing from a direct current measurement.		✓

CONTRAIL SOFTWARE

Contrail software collects, stores, analyzes, and disseminates data from road weather solutions to organize and manage your road weather data. Contrail can be accessed on devices with a standard web browser so you can monitor your data remotely at any time. Data can be collected from multiple different sensors, and customizable alerts can be set up for specific conditions measured by the sensors.

Contrail provides extensive visualization and analysis of real-time or historic data. This can help predict future weather events to better prepare operations personnel for handling severe weather events. Customizable alarms can be set up for specific conditions along with multiple delivery methods of the alarm to ensure that the necessary people, including maintenance and operations personnel, are aware of the event. Special screens and configurations are also available for road weather.

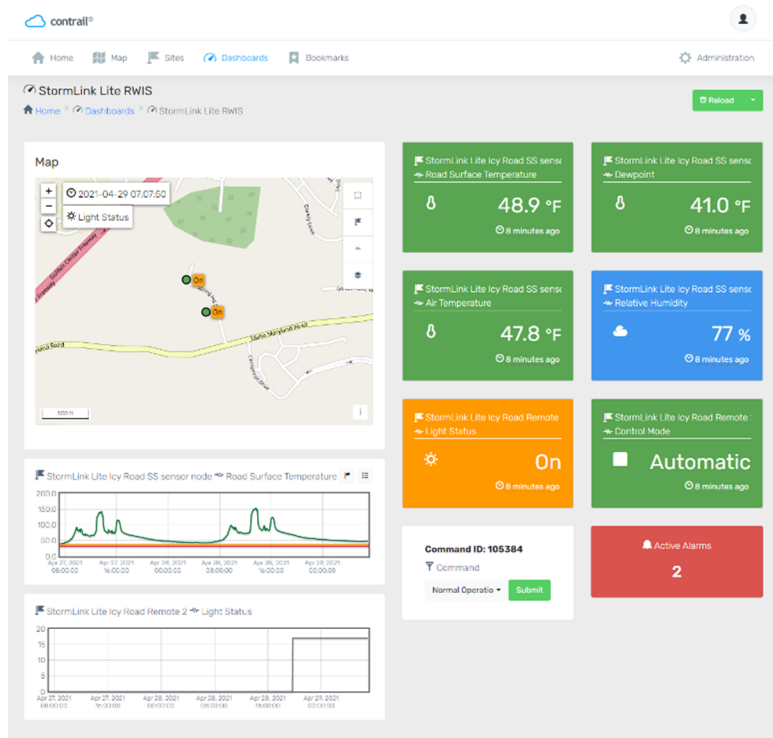


FEATURES

- Road Conditions
- Custom Dashboard Displays
- Weather Conditions
- Snowplow Operations
- Flooded Roadway Gate Status
- Embedded Video/Image Displays
- Thresholds for Display and Alarms
- Advanced Alarms and Notifications

ACCESS FROM ANYWHERE

Contrail software for road weather is mobile ready—there's no special "app" required for your smart phone, tablet, or other mobile device



Contrail © 2004 - 2021 [dwd]

CONTRAIL CAMERA

Gain greater visual insights and situational awareness with remote image monitoring. Create a more complete view of road conditions with Contrail Camera image collection, hosting, and viewing platform. Whether you have existing cameras or are planning to add them, Contrail Camera provides you with enhanced information and valuable insights for situational awareness.

Advanced capabilities with Vision license

The full-featured Vision license combines the Contrail Camera framework with AI (Artificial Intelligence) machine learning models to detect and tag objects in each image. This capability is particularly useful for the remote monitoring of flooded roadways, enabling the automated detection of people and vehicles in dangerous situations.

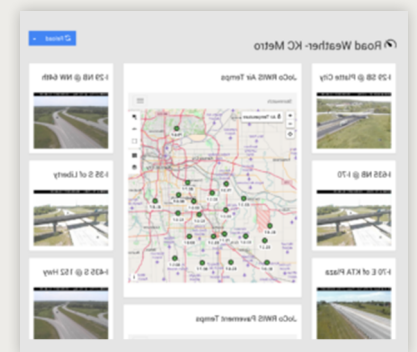
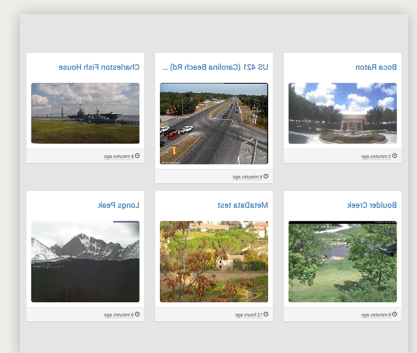


Using AI and machine learning, Contrail Camera with Vision automatically captured and correctly tagged this image of a vehicle driving through a flooded roadway on May 1, 2021 in Bexar County, Texas.

CONFIGURATIONS

Contrail Camera is a centralized web-based image storage and management tool that provides secure, 24/7 password-protected access to view and manage images. It easily integrates with the Contrail enterprise software so you can incorporate images into Contrail Dashboards and Map Layers to show sensor data and images side-by-side.

Users can assimilate large volumes of sensor data in Contrail for visual representation using maps, charts, graphs, widgets, and dashboards. Combining this data with access to live cameras provides a very quick understanding of an event as it is occurring and can help users improve their situational awareness.



Road Weather Systems in action

Bexar County, Texas

With a population approaching 2 million, Bexar County is the 4th largest county in Texas, and includes the city of San Antonio. Texas is one of the states with the most flood-related deaths and holds half of the world record rainfall rates for precipitation rates in 48 hours or less. Bexar County's relatively dry climate and numerous low water crossings in the area make it highly susceptible to roadway flooding. Floods can generate very quickly, even if you don't physically see it raining. Fast-moving water as little as two feet can easily move a car and present serious dangers to drivers trying to pass through it.

Roy Alaquinez, Civil Engineering Assistant for the County of Bexar Public Works Department, has been working with High Sierra Electronics for over 10 years.

To increase flood resilience for vulnerable roadways, Bexar County implemented [High Sierra Electronics](#)' high water detection and flood warning systems in especially dangerous flooding areas in 2007. Water level sensors are placed next to the road where the water normally flows and measures water and precipitation levels. A warning is sent in real-time when water is nearing road level, and again when it passes the road level. Warning stations in Bexar County consist of flashing signs and flood gates that deploy when the water levels get too high to make sure no vehicles try to pass through.

On May 1, 2021, Bexar County experienced severe flooding that was recorded in their Contrail software and camera systems. The [High Water Detection System](#) was able to communicate the rising water levels that initiated the flood warning signals and gates to protect motorists from the flooding roadway. The real-time monitoring of High Sierra's High Water Detection System makes sure that motorists are aware of a severe flooding event before they come across it, keeping them safe in an efficient and timely way.



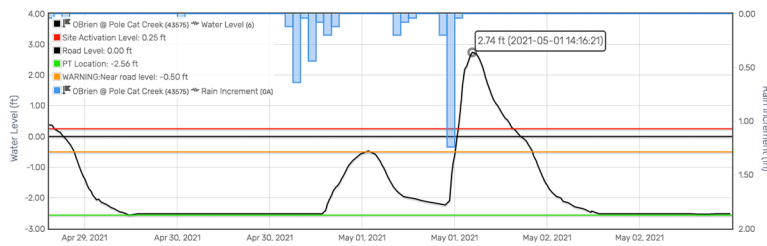
Our High Water Detection System Project consists of installing monitoring systems at low water crossings throughout the county," Roy said, "High Sierra Electronics provided all the equipment, did all of the installations and they continue to provide preventative maintenance on these systems. The company has provided quality products and professional service throughout this period. Our experience with High Sierra Electronics has been positive.

— Roy Alaquinez
Civil Engineering Assistant for the County
of Bexar Public Works Department





Image from the Bexar County High Water Detection camera showing a flooded roadway on May 1, 2021.



A graph from Bexar County's Contrail showing a timeline of high water during the May 1, 2021 flooding event.

Floods are the most common natural disaster in the United States. Without high-quality high water sensors and flood warning systems, people could misconceive how dangerous the flood is and continue to drive through it. Alerting motorists when there is a flood and stopping them is essential to keeping communities safe.



About AEM

AEM is combining global technology leaders to empower communities and organizations to survive and thrive in the face of escalating environment risks.

By deploying and operating reliable sensing networks on a secure and scalable data infrastructure, and transforming the data into actionable visualizations, analytics, and alerts delivered through purpose-built applications, AEM serves as the essential source for environmental insights. These technologies enable positive outcomes, helping reduce environmental impact and creating a safer and more resilient world. For more information, visit www.aem.eco.

AEM's family of innovative brands include Davis Instruments, Earth Networks, FTS, High Sierra Electronics, Lambrecht meteo, OneRain, and Vieux & Associates.



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