

# Vaisala ROSA

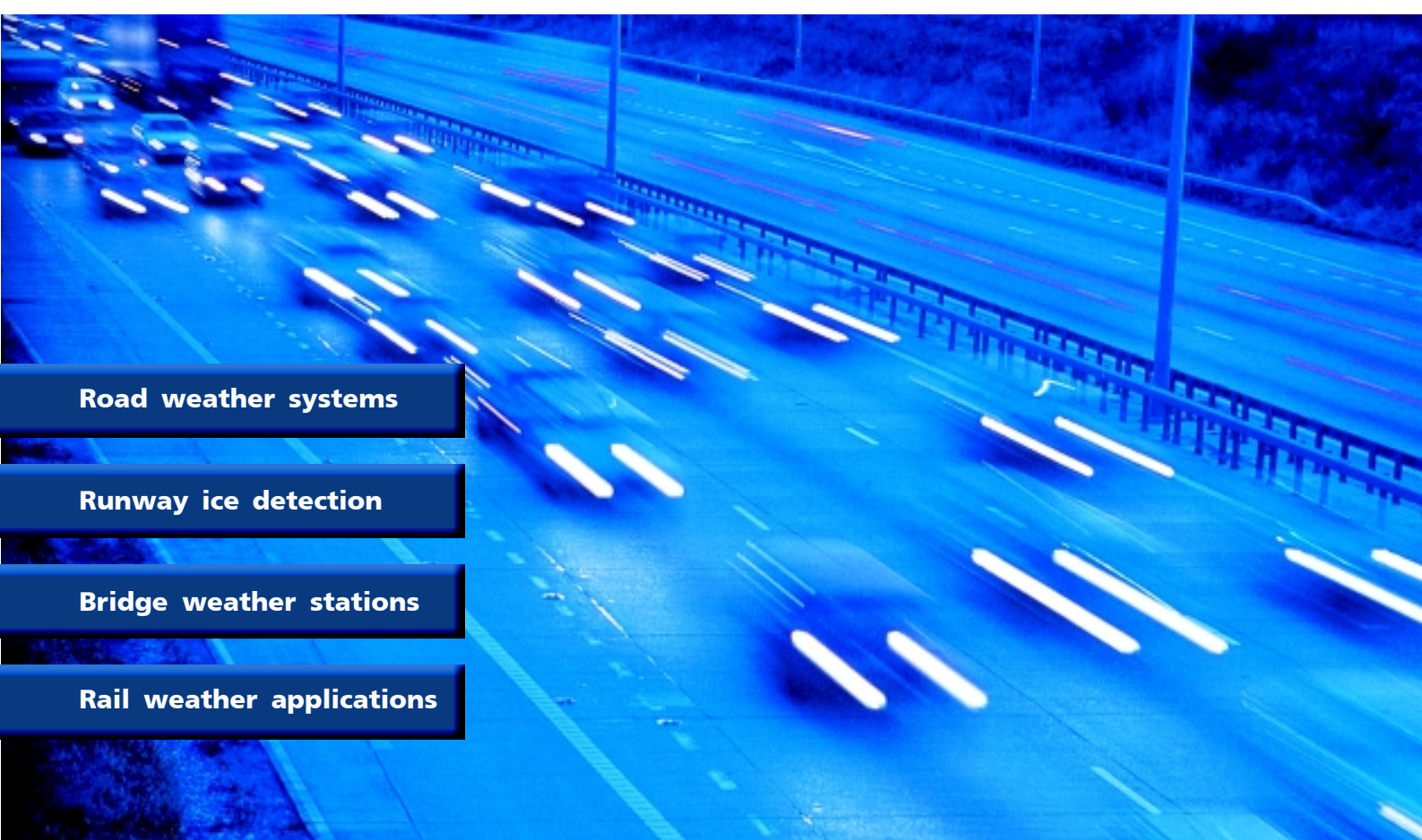
Road Weather Station



For better road maintenance in winter

# An Investment in Traffic Safety

**The Vaisala ROSA Road Weather Station** is the complete solution for the remote detection of surface weather conditions on roads and runways. It gathers real-time data on road/runway surface conditions, visibility, precipitation type and meteorological parameters. ROSA is an invaluable tool for ensuring traffic safety and planning road and runway maintenance activities.



Road weather systems

Runway ice detection

Bridge weather stations

Rail weather applications

The Vaisala ROSA Road Weather Station measures the essential road and runway surface weather conditions. It reports the presence of ice (including black ice), and measures surface and ground temperature, air temperature, humidity, dewpoint, precipitation type and water layer thickness.

The new DRS511 Road/Runway Sensor is the heart of the standard ROSA configuration, which also offers sensors measuring precipitation, air

temperature and humidity. Optional sensors can be added to measure visibility, present weather, air pressure, additional temperature parameters, snow depth, and wind speed/direction. Communication options include dial-up modems, leased lines, GSM and radio modems among others. Consuming little power, ROSA can be operated on mains or solar power. Battery backup options are available.

## **Act before the surface freezes**

ROSA brings together road/runway surface measurements and meteorological data to characterize the surface state: dry vs. wet vs. slippery. Alarms are issued only when surface conditions genuinely warrant it.

Recent improvements include more accurate measurement of water layer thickness, leading in turn to a more accurate measurement of de-icing

#### Road surface states reported

- dry
- moist
- moist & chemical
- wet
- wet & chemical
- frosty
- snowy
- icy



*With Vaisala ROSAs at the roadside, you know where and when road surface weather conditions are changing. So you know when to perform road/runway maintenance proactively, improving the effectiveness of your maintenance fleet and cutting costs.*

chemical concentration. When the concentration of de-icing chemical is known, ROSA determines the depression in freezing point of the road surface solution. This is the key to knowing when to perform pre-emptive road and runway maintenance.

ROSA is fully operational with one Vaisala DRS511 Road/Runway Surface Sensor, but up to 8 DRS511s can be connected to one ROSA if wider coverage is desired.

#### Build the network you need

Modularity has always been a basic principle driving ROSA development.

You can start with one ROSA as a stand-alone station, adding sensors or building up a network of ROSAs to help you handle changing winter maintenance demands.

To cover problematic stretches of road or runway, up to 16 remote substations can be linked in an RS-485 line to a master station. Additional surface sensors and atmospheric sensors can be added to the remote substations, which can measure surface weather conditions up to 1.5 km from the master station. To reduce cabling costs, radio modems can be used for communication between the remote substations and master station.

#### New optical surface sensor

The new Vaisala DRS511 Road/Runway Surface Sensor operates on the principle of thermal passivity. It uses very little power: heat does not reach the surface to interfere with measurement accuracy. Thus the DRS511 accurately measures surface conductivity, electrochemical polarization, surface capacitance (used to detect black ice), surface temperature, ground temperature and water layer thickness.

Working on the principle of optical reflection, the DRS511 uses an “eye” to report the presence of water, ice and snow on the road/runway surface.

It also directly measures water layer thickness, the key to accurately calculating the concentration of de-icing chemical. The surface conductivity and electrochemical polarization measurements are used to calculate the amount of de-icing chemical. Once this is known, the concentration of de-icing chemical in the solution is automatically calculated and the depression of freezing point is determined. In combination with other factors such as road surface temperature, this is invaluable for knowing when to begin de-icing activities.

### Effective de-icing at airports

ROSA reliably detects and predicts hazardous runway and taxiway surface conditions, allowing airport authorities to improve anti-icing operations. ROSA accurately calculates the concentration of special de-icing chemicals (e.g. Clearway, Safeway) used at airports to determine depression of freezing point.

### Data management with IceCast™

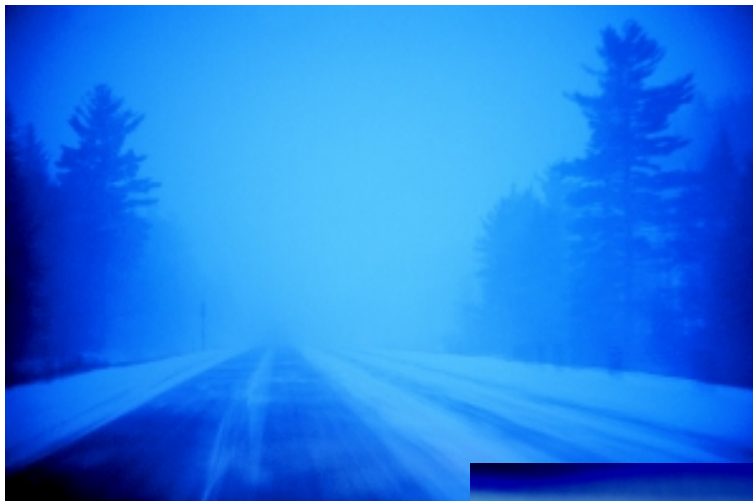
ROSA road weather stations are an integral part of the Vaisala IceCast Ice Warning and Prediction System. For ice

and snow warning, IceCast provides a number of data collection, handling and display software modules. For ice and snow prediction, IceCast provides NowCasting and 24-hour forecasting. NowCasts are 3 or 6-hour forecasts of surface temperature and state, generated automatically for specific ROSA locations. The 24-hour forecasts are produced using the world's most popular ice prediction model, developed by Vaisala.

### Give drivers time to react

Electronic road signs can be integrated with ROSAs to present real-time information on road weather conditions. Drivers are warned of hazardous conditions. ROSAs can also be configured to trigger automatic salt sprayers and other automatic road maintenance devices.

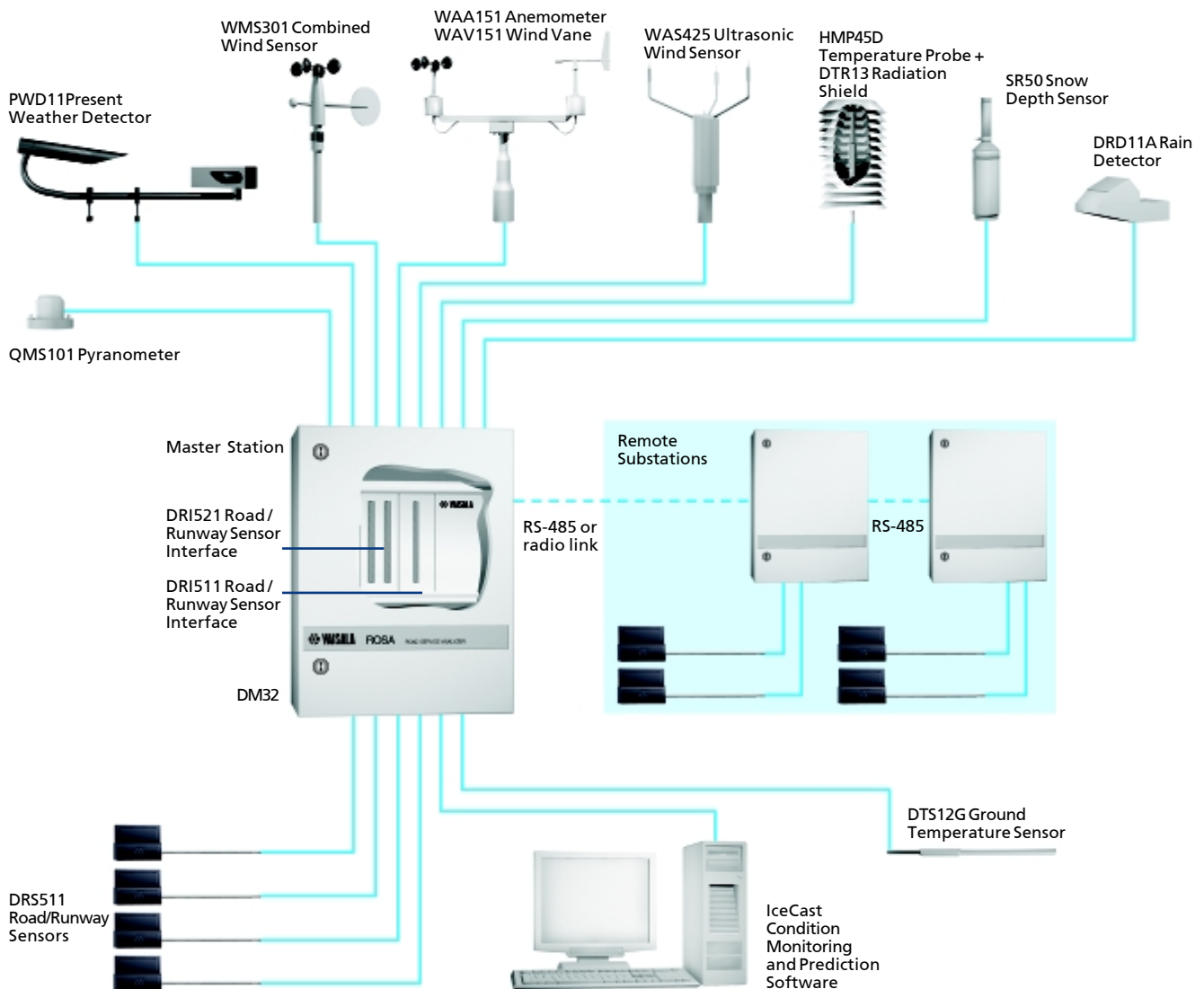
*The DRS511 Road / Runway Surface Sensor.*



*In a uniquely compact package, the optional PWD11 Present Weather Detector accurately measures visibility and precipitation.*



# Select Your Sensor Configuration



## Standard measurements

- Road sensor (DRS511) with
  - surface and ground temperature
  - surface conditions
  - black ice
  - water layer thickness
- Precipitation detection (DRD11A or PWD11)
- Air temperature and humidity (HMP45D)

## Optional sensors

- Wind speed and direction sensors: WAA151, WAV151, WAT12, WMS301, WAS425
- Visibility sensor: FD12
- Present weather sensor, reporting visibility and precipitation type: PWD11, FD12P
- Additional ground temperature sensor: DTS12G
- Pressure sensor: PMB100
- Snow depth sensor: SR50
- Solar radiation sensor: e.g. QMS101
- Tipping bucket rain amount sensor: e.g. RG13

## Power

- Mains or DC
- Solar options
- Battery backup options ranging from 2 Ah upwards

## Communication options

- Dial-up modem (e.g. DMX50ICE)
  - Leased-line (e.g. DMX55U)
  - GSM
  - Radio modems
- (ROSA complies with several open protocols such as BUFR and NTCIP)

# Technical Information

## Environmental

|             |                                          |
|-------------|------------------------------------------|
| Temperature | -40 °C to +60 °C                         |
| Humidity    | 0 to 100% RH, non-condensing             |
| Vibration   | IEC-68-2-6 Fc, 10 - 500 Hz, up to 2.0 G  |
| EMC         | Complies with 89/336/EEC (FCC 15 part J) |

## Electrical

|                                                                     |                       |
|---------------------------------------------------------------------|-----------------------|
| Mains connection                                                    | 230/115 VAC, 50/60 Hz |
| DC connection                                                       | 11 - 30 VDC           |
| Power consumption without sensors or modems with one interface card | Typ. 0.8 W            |

## Physical dimensions

|                          |                          |
|--------------------------|--------------------------|
| DMF133 (WxHxD)           | 148 mm x 242 mm x 111 mm |
| DM32 with BOX30S (WxHxD) | 240 mm x 400 mm x 146 mm |
| DM32 with BOX53S (WxHxD) | 360 mm x 520 mm x 150 mm |

## \*Road surface data generated by ROSA™

|                                    |                                                                       |
|------------------------------------|-----------------------------------------------------------------------|
| Surface states                     | Dry, moist, moist & chemical, wet, wet & chemical, frosty, snowy, icy |
| Warnings                           | ice alarm, ice warning, frost warning, rain warning                   |
| De-icing chemical                  | Amount (g/m <sup>2</sup> ) and concentration (g/l)                    |
| Water layer thickness in mm        |                                                                       |
| Depression of freezing point in °C |                                                                       |
| Black ice detection                |                                                                       |
| Surface temperature in °C          |                                                                       |
| Ground temperature in °C           |                                                                       |

\*Mix of meteorological data is dependent on the sensor configuration.

## Basic components in the DM32 (ROSA data logger)

DMF 133 frame

- Aluminum profile case for housing ROSA cards
- Total capacity 5 card slots
- Includes the DMB133 motherboard
- DPS133 power supply board
- Transformer
- AC socket
- Fuse and mains switch
- Screw terminal for RS-485 serial line
- DC and AC power supply extensions

DRI521

- Full two-slot road sensor interface card with inputs for two DRS511 road sensors and meteorological sensors
- RS-232 communication interface
- 80C51-based processor for measurement control and road surface data processing and analysis

DRI511

- Single-slot road sensor interface card with inputs for two DRS511 pavement sensors and an RS-232 communication interface
- Allows several road sensors to be installed in one station
- Can also be used in remote substations



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All specifications subject to change without prior notice.



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