

# Solutions for winter road maintenance



Non-invasive Road Weather Camera

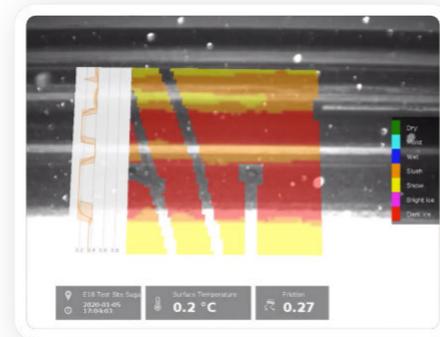
# 2DRoad

-  2 dimensional (2D) road detection
-  4096 simultaneous sensing points
-  8 road surface conditions & fog detection



## Key Benefits

2DRoad is the world's first non-invasive weather camera which offers a full multi-lane description of the road with a detection area up to 6 x 6 metres and a 64 x 64 = 4096 pixel detection resolution. 2DRoad distinguishes between 7 road surface statuses: dry, moist, wet, slush, snow, bright ice, and black ice as well as estimates a road surface friction.



## Parameters

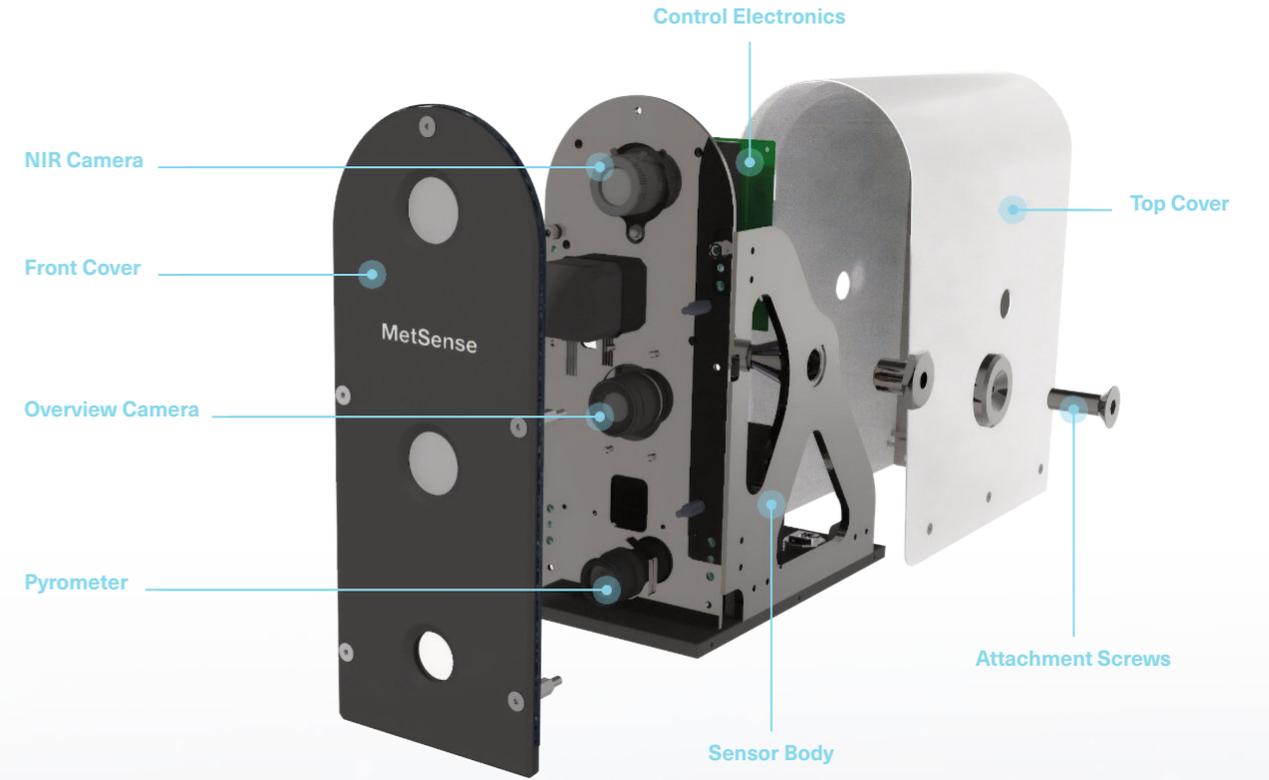
Detection Principle	Near-infrared spectroscopy
Road Conditions	Dry, Moist, Wet, Slush, Frost, Snow, Bright Ice, Black Ice
Detection Area	Up to 6 x 6 m
Water & Ice Layer Thickness	0 to 2 mm, resolution 0.01
Snow & Slush Layer Thickness	0 to 10 mm, resolution 0.01
Dimensionless Friction	$\mu$ : 0 to 1, resolution 0.01
Road Surface Temperature Range	-40 to +60 °C, resolution 0.1
Temperature Sensor Accuracy	$\pm$ 0.3 °C
Dew Point Range	-40 to +60 °C, resolution 0.1, with external sensor
Data Refresh Rate	Every 6 minutes, i.e. 10 measurements / hour
Data Connectivity	Embedded 4G / LTE Modem
Operating Temperature	-40 to +60 °C
Power Supply	110 - 230 VAC
Power Consumption (Heating Off)	<35 W continuous, 110 W peak
Power Consumption (Heating On)	<285 W continuous, 360 W peak
Installation Height	6 - 8 m, at 10 to 60°, on pole or portal
Sensor Dimensions & Weight	133 x 294 x 327 mm, 9 kg
Flasher Dimensions & Weight	289 x 290 x 303 mm, 6 kg
Cabinet Dimensions & Weight	1000 x 600 x 240 mm, 54 kg
Ingress Protection	IP 65
Cable Length	6 m cabling between Cabinet and Sensor

## Installation

The sensor and the flasher can be mounted on any post or portal using stock clamps. Measuring distance can vary between 4 and 10 metres with an inclination angle between 10 and 60 degrees from the vertical. Sensor height defines the extent of the scanned area - as small as a single lane, but as large as two full lanes.



## Product



Mobile Laser Sensor

# MetRoad Mobile



easy data access



non intrusive monitoring of the road surface



surface condition & friction

## Key Benefits

MetRoad Mobile is a mobile laser sensor for monitoring road conditions such as dry, wet, icy and snowy and also calculating friction between the road and the wheels of a vehicle. Available options include integrated mobile data transmitter and GPS logger.

## Parameters

Detection Principle	Near-infrared spectroscopy
Road Conditions	Dry, Moist, Wet, Ice, Slush, Snow, Unknown
Detection Area	Across a road network (GPS tracked with data logger)
Dimensionless Friction	$\mu$ : 0.0 to 1.0
Data Refresh Rate	Continuous (via RS 232), 1 Hz (over data logger)
Data Connectivity	RS 232 (probe only), 4G / LTE (with data logger)
Operating Temperature	-30 to +40 °C
Power Supply	8 to 15 VDC
Installation Height	~ 0.5 m above road, at ~ 45°
Sensor Dimensions & Weight	298 x 50 x 50 mm, ~ 0.5 kg
Cable Length	3 m standard, or specified upon order

## Installation

MetRoad Mobile can be installed on any vehicle with a tow hook. An installation bracket is delivered as part of the product. The bracket clamps the sensor to the front bumper tow hook. The sensor inclination angle is then adjusted with a rosette so that the sensor is aimed as intended (into the wheel track).



Active Road Sensor

# MetSalt

-  removable electronics
-  easy maintenance
-  accurate detection of the freezing point



## Key Benefits

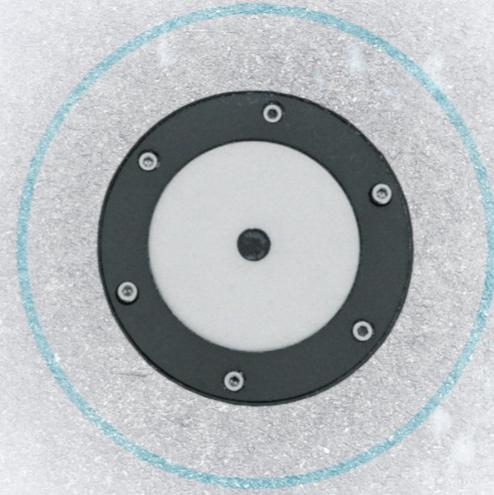
MetSalt is a unique low-power embedded road sensor for accurate measuring of the road temperature and even more accurate detection of the freezing point. It is equipped with an external temperature probe which enables temperature measurement in a specific depth.

## Parameters

Detection Principle	Continuous cycle of heating and cooling
Detection Area	2 detection points: sensor, external probe
Freezing Point	-40 to 0 °C
Freezing Point Accuracy	±0.5 °C
Road Surface Temperature Range	-40 to +60 °C
Subsurface Temperature Range	-40 to +60 °C
Temperature Sensor Accuracy	±0.1 °C
Data Refresh Rate	Temperature continuously, freezing point every ~30 minutes
Data Connectivity	RS 485 Modbus
Operating Temperature	-40 to +60 °C
Power Supply	12 VDC
Sensor Dimensions & Weight	120 (dia) x 57 mm, 1.2 kg
Ingress Protection	IP 66
Cable Length	50 / 100 / 150 m variants

## Installation

The sensor is mounted in the pavement. The exact detection of the freezing point is possible thanks to an intelligent active method of cooling and heating the solution on the road surface independently on the de-icing agent used for winter maintenance. External temperature probe provides the road surface temperature measured at the top part of the sensor and can measure the deep road temperature at a given location according to the depth of the installation.



## Product

"S" Installation Holder



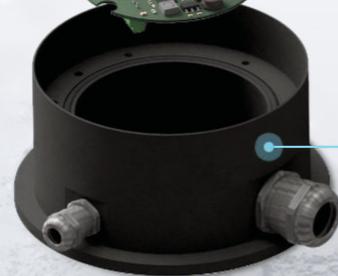
Sensor Probe



Control Electronics



Sensor Body



# About Us

 **MetSense**

MetSense, a daughter company of Klimator, is a synonym of novel sensor design and development.

With a small yet ambitious core team, MetSense plans to shift the Winter Road Maintenance paradigm with its product portfolio, particularly the 2DRoad and MetSalt.

## MetSense Philosophy

"If we were to build a Winter Road Maintenance System from scratch, what would it look like?" At MetSense we repeatedly ask ourselves this question - and come up with the answer that it would be quite different to what maintenance organisations worldwide are using right now. We believe that the future Winter Road Maintenance Systems should utilise existing network of Road Weather Stations, however, further system expansions should focus on providing spatially and temporally granular measurements of road surface temperature, status, and freezing point. MetSense's product portfolio and product development pipeline focus heavily on the provision of these parameters.



Designed and developed in Sweden  
Manufactured in the European Union

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