



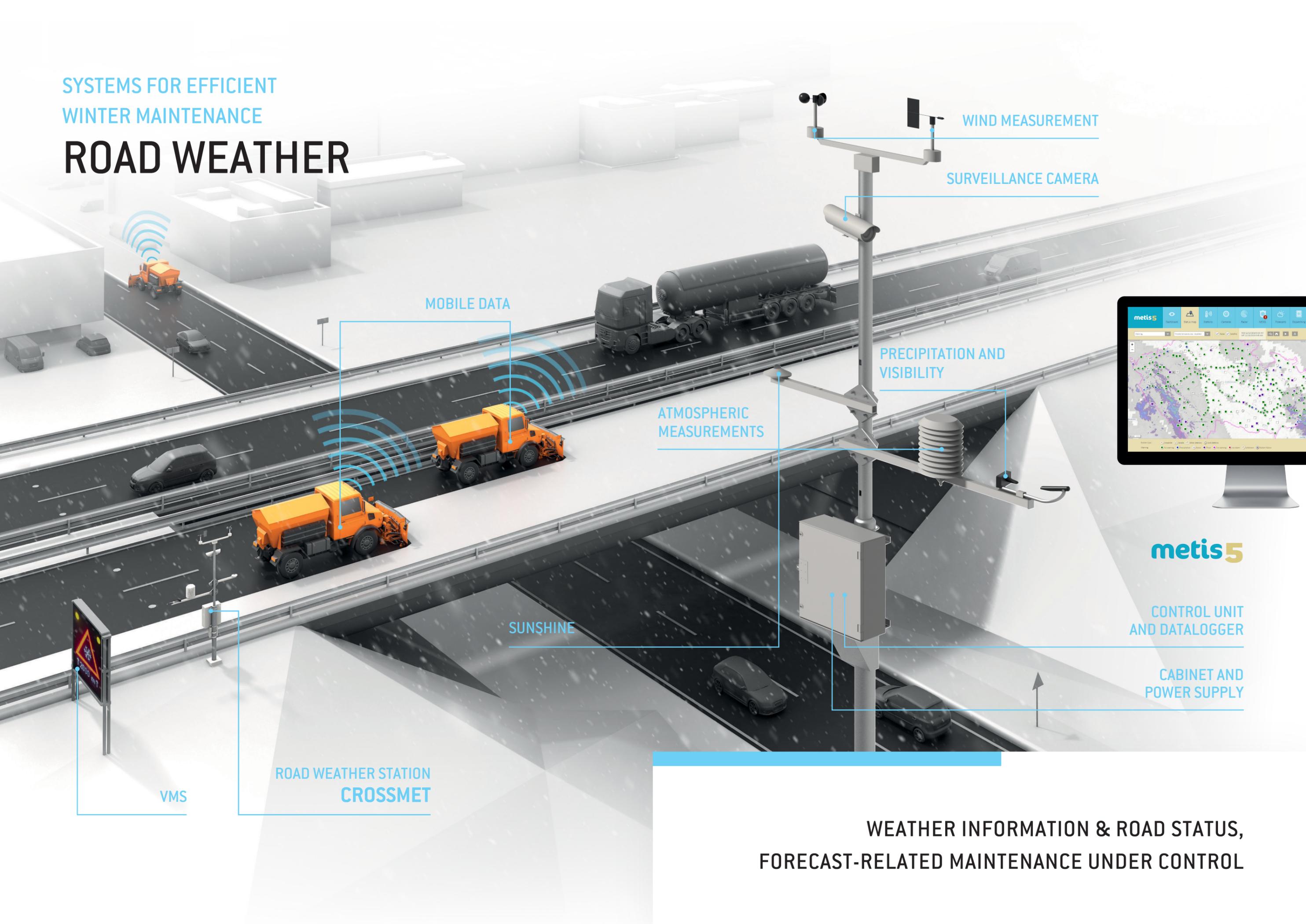
ROAD WEATHER



MOVING AHEAD  
IN ANY WEATHER

SYSTEMS FOR EFFICIENT  
WINTER MAINTENANCE

# ROAD WEATHER



MOBILE DATA

WIND MEASUREMENT

SURVEILLANCE CAMERA

PRECIPITATION AND  
VISIBILITY

ATMOSPHERIC  
MEASUREMENTS



metis5

CONTROL UNIT  
AND DATALOGGER

CABINET AND  
POWER SUPPLY

SUNSHINE

ROAD WEATHER STATION  
CROSSMET

VMS

WEATHER INFORMATION & ROAD STATUS,  
FORECAST-RELATED MAINTENANCE UNDER CONTROL

WINTER MAINTENANCE UNDER CONTROL

# ROAD WEATHER

The challenge faced each year is to keep roads passable even in extreme wintry conditions. The Road Weather system monitors how surfaces are affected, informing administrators about problematic spots and recommending suitable measures. Investing in it increases safety while also saving time and money.



### Safer roads in any season

Ice or heavy snowfall require rapid and effective action, and it is necessary to preempt such a circumstance. Our systems provide a detailed overview of the weather situation on roads in addition to delivering specialized forecasts and recommendations. Stay one step ahead of the elements.



### Save on maintenance costs in the winter

Monitoring the performance of maintenance tasks and gauging their efficiency prevents excessive consumption of materials and wasted effort. Aided by up-to-date information on traffic flow and peak-time conditions, create plans and schedules based on accurate weather data. Adding the financial analysis module keeps costs directly under control.



### Superior road maintenance, simplified

Benefit from an overview of an entire road network, present conditions and the weather forecast for the coming hours. Utilize the data available for wintertime maintenance vehicles, their current activity and potential capacity. Make informed decisions and plan accordingly.



### No more unpleasant surprises behind the wheel

No two roads are the same, so keeping drivers abreast as to their current status and warning about possible hazards or restrictions is sure to be welcomed by those at the wheels of winter service vehicles and passenger cars alike.



CONTROL UNIT

# CROSSMET



This control unit for the CROSS road weather station connects to a wide range of meteorological sensors. An open platform, its function as a universal datalogger allows data to be processed and transferred.



Full control using API



Low consumption



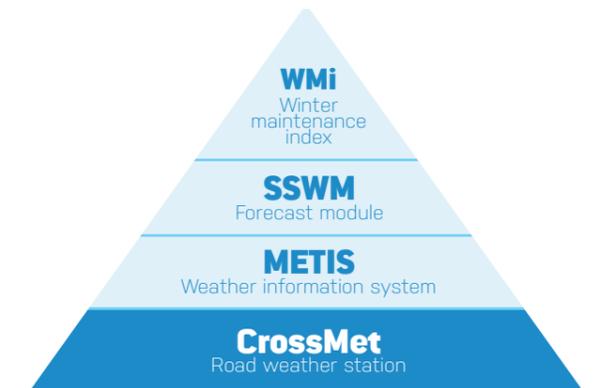
Compatible with third-party sensors

## KEY FEATURES

- Communication by GPRS/LTE, TCP/IP, special emergency lines (SOS), Wi-Fi, radio or fibre-optic cable
- Adaptation of device outputs to suit specific applications (e.g. message boards)
- Power supply options – interrupted sources for public lighting, solar panels, wind turbines or independent fuel cells
- Fully remote configuration and monitoring using API or web interface

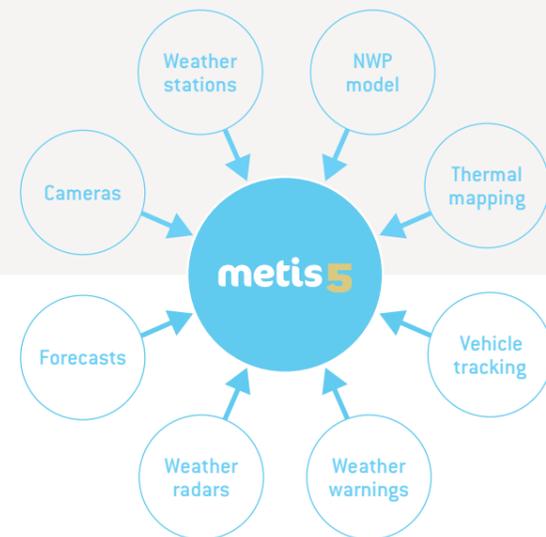
- Road condition sensors
- Air temperature, humidity, dew point
- Precipitation
- Visibility and present weather conditions
- Wind speed and direction
- Surveillance camera with night vision

CROSS has come a long way in the highly complex feat of discerning how roads are affected by weather conditions. The robust system we have devised provides superior functionality invaluable to users wherever it is applied in the world.

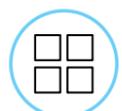


# METIS

A unique suite of software for obtaining data on roads relating to weather conditions, present circumstances and future scenarios, METIS provides a comprehensive overview in real time.



After a decade of version 4 operation, the 5th generation of METIS saw the light of day in 2021 with many improvements. The system boasts many useful features. Key amongst these is the status map, displaying a wealth of meteorological data to aid spatial perception of weather-related trends. Users benefit from a clearly arranged dashboard, interactive graphs of measured data and diverse forecast products. Another standout feature is what we have dubbed the Performance Module. This provides online feedback on the efficiency of winter maintenance tasks and the progress of service vehicles.



Dashboard



Status map



Weather stations



Cameras



Radar



METIS mobile



## ADVISORY SOLUTION FOR MAINTENANCE

# SSWM

A comprehensive maintenance decision support tool for determining future road conditions and forecasting road surface temperature, it leverages a sophisticated prediction kernel and unique approach to GIS to anticipate the state of each stretch of road. SSWM calculates and recommends measures for conducting thorough maintenance, including the amounts of salt needed for particular areas.



Aids informed decision-making



Increases road safety



Minimizes expenditure



12 hours forecast



## KEY FEATURES

- Integration of all relevant data sources
- Updated every hour
- Prediction of road status – dry, wet, snow, snow drifts, frost, ice
- Resolution for every 1 km of the road network
- Field-proven, precise predictions
- Recommended treatments to be applied by road maintenance operators
- Convenient implementation on new road networks
- Use of maintenance data and thermal mapping
- Direct integration with METIS



## ANALYSIS OF WINTER MAINTENANCE AND COSTS

# WMi

A helpful tool for efficiently managing expenditure on road maintenance in the winter, it provides data on national and regional standards and oversees compliance with a view to enable a balance between safety and costs.

### SEVERITY OF WINTER MAINTENANCE

- Use of road weather and professional climate stations
- Monitors snowfall, snow drifts, temperature, humidity (frost and ice)
- Standardized to cells of 100 x 100 m
- Takes geographical conditions into consideration (altitude, land use, etc.)

### PERFORMANCE MODULE

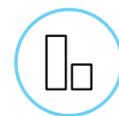
- Vehicle tracking via GPS units – online monitoring and automatic reporting of activity and salt consumption
- Visualization, validation and reporting of data
- Evaluates the adequacy of winter maintenance and efficacy of expended costs
- Automatic invoicing module

### WINTER CONDITIONS VS. PERFORMANCE OF TASKS

- Statistical analysis for comparison over the long term
- Independent of location, climate and extent of a road network by different contractors
- Stipulates the standards to be met for specific winter conditions
- Reveals deviation from standardized maintenance requirements



GPS vehicle tracking



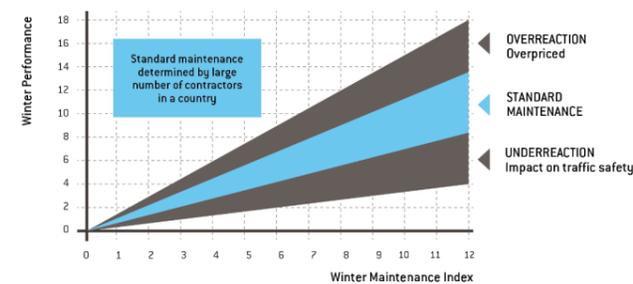
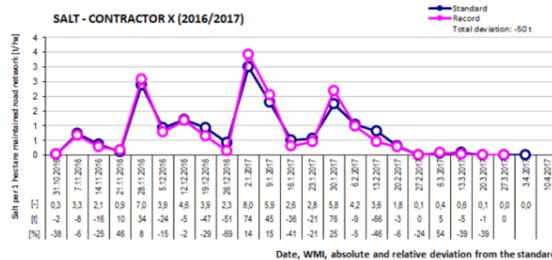
Performance reporting



Performance and adequacy check

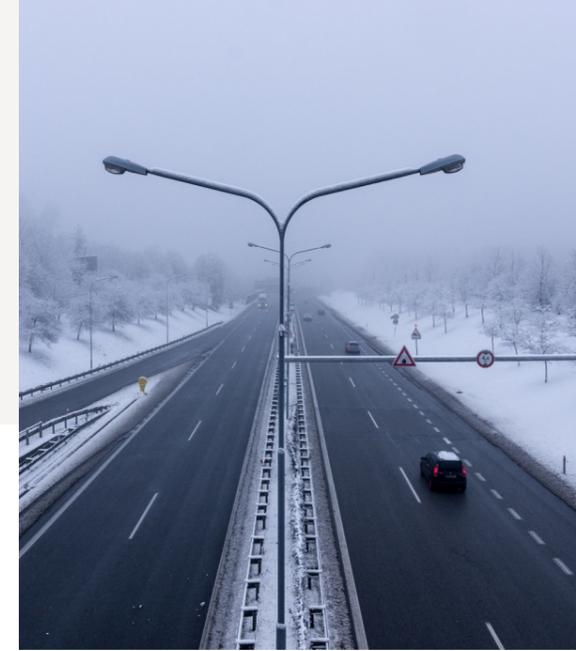


Financial controlling



## MONITORING THE ROAD NETWORK IN THE CZECH REPUBLIC

# CASE STUDY



Systematic installation of a road weather network of stations has been underway in the Czech Republic since the mid-1990s.

It is currently equipped with more than 650 units, all of them integrated with the METIS system, facilitating the monitoring of over 55,000 km of roads throughout the country. It is an ongoing project and more stations continue to be added to it.

METIS software and related modules (SSWM, WMi) are used for this purpose by the national road authority and a number of other entities – cities, regional authorities and private companies (e.g. technical services).



### REFERENCES



#### Czech Republic

Nationwide road weather system



#### Valteřice, Czech Republic

Road weather camera 2DRoad



#### Bulgaria

Establishing an RWS network



#### Sweden

Pilot road weather information system

Other references



A REVOLUTIONARY  
BREAKTHROUGH

# 2DRoad

Through an exclusive partnership and representation deal with the MetSense company, CROSS has been granted the right to install and operate an innovative, technologically advanced camera for judging how weather conditions affect roads dubbed *2DRoad*.

A major breakthrough in determining the status of road surfaces in two dimensions, it lends a completely new perspective to analysing weather conditions. The camera is able to read the entire profile of a road – an area up to 6 x 6 m wide. Unlike other non-invasive sensors that only focus on a single point or small area of road, the 2DRoad camera handles 4096 points simultaneously, each of which is gauged if it is dry, wet or covered in ice or snow. The temperature of the surface is measured at a point approximately in the centre of the scanned area.



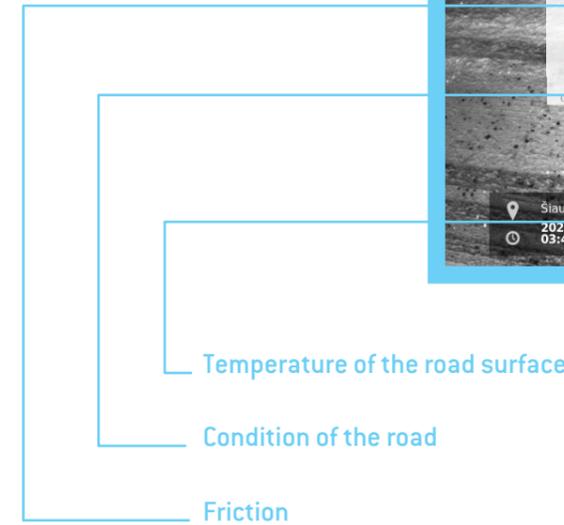
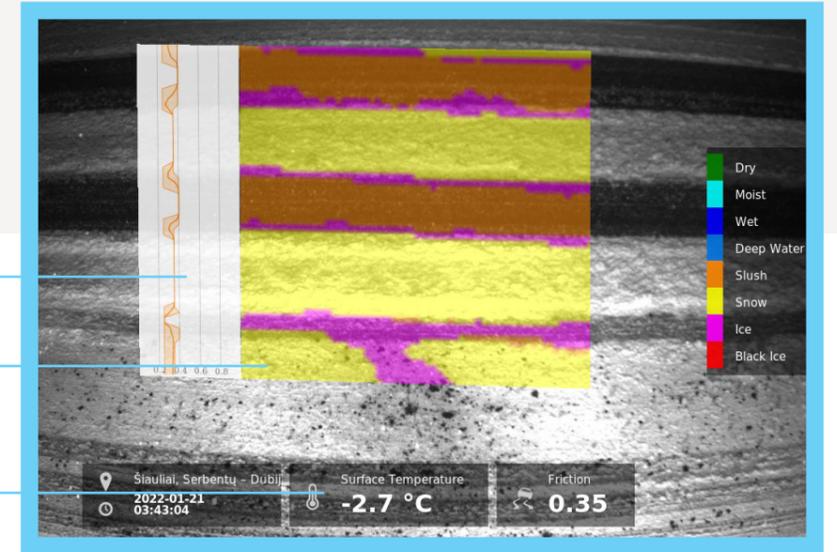
Road weather camera



Road scanning in 2D



8 road surface conditions



- Option to set custom dimensions for the area scanned
- No need to physically modify roads
- Clear visual output



[www.metsense.com](http://www.metsense.com)



MOBILE LASER SENSOR

# MetRoad Mobile

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





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