



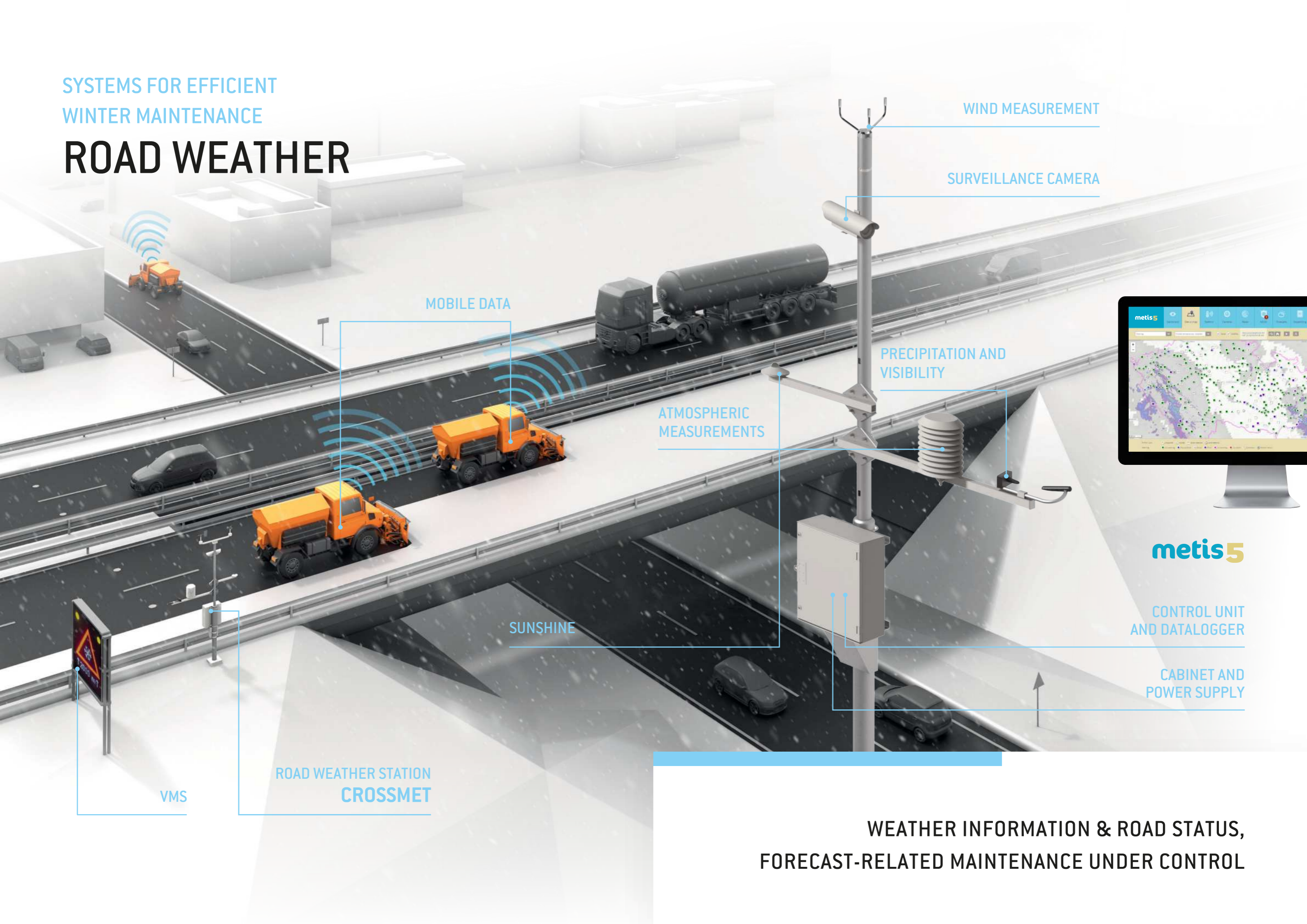
ROAD WEATHER



**EVEN BAD WEATHER
WON'T STOP YOU**

SYSTEMS FOR EFFICIENT
WINTER MAINTENANCE

ROAD WEATHER



WIND MEASUREMENT

SURVEILLANCE CAMERA

MOBILE DATA

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, heavy snowfall or snow tongues require quick and effective action. 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.



Cost savings for winter maintenance

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

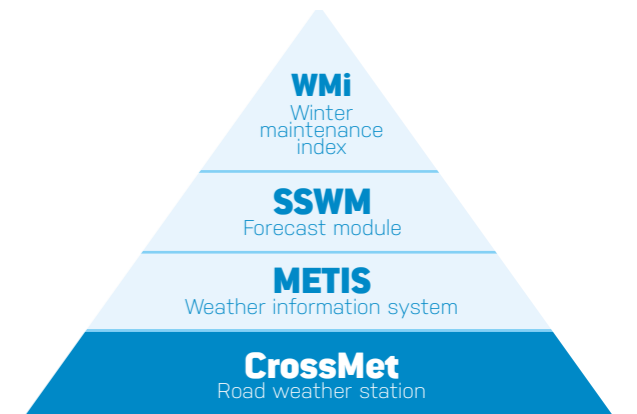
KEY FEATURES

- 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

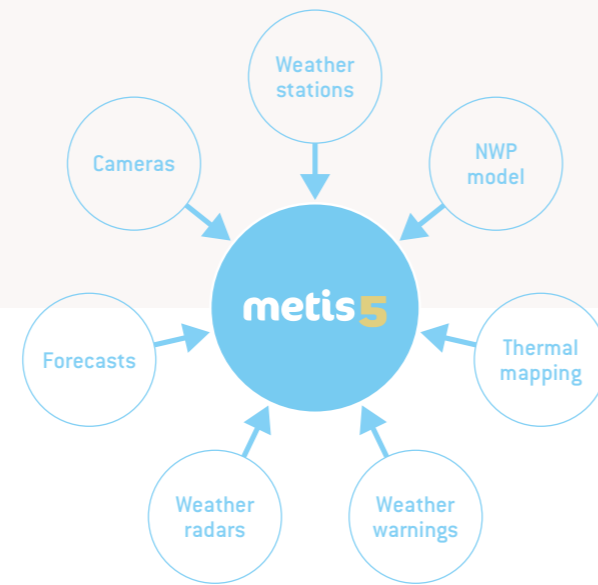


CROSS has come a long way in the highly complex feat of discerning how roads are affected by weather conditions. The robust system we have devised provides superior functionality invaluable to users wherever it is applied in the world.

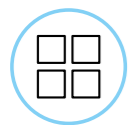


METIS

METIS is a unique online information system designed to collect, process and 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. If users are interested, METIS can be supplemented with other specialised modules that provide additional information and increase the utility value of METIS.



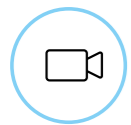
Dashboard



Status map



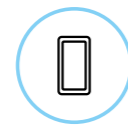
Weather stations



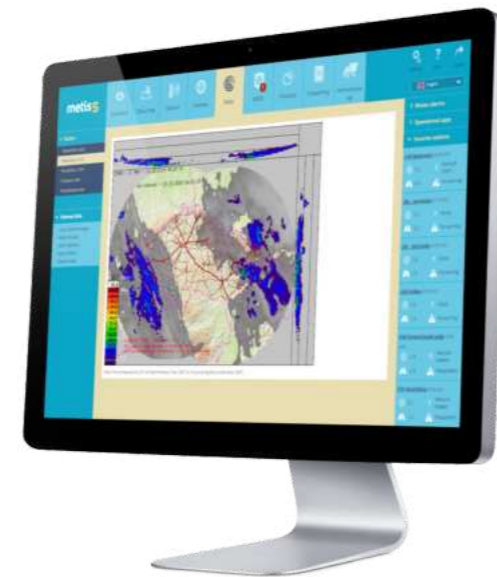
Cameras



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.)

WINTER CONDITIONS VS. PERFORMANCE OF TASKS

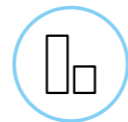
- Statistical analysis for comparison over the long term
- Independent of location, climate and extent of a road network by different contractors
- Stipulates the standards to be met for specific winter conditions
- Reveals deviation from standardized maintenance requirements

EVALUATION

- 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



GPS vehicle tracking



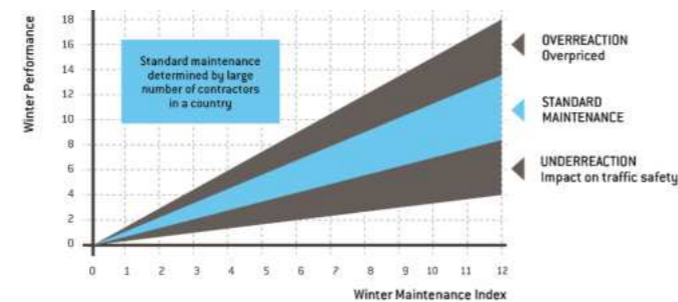
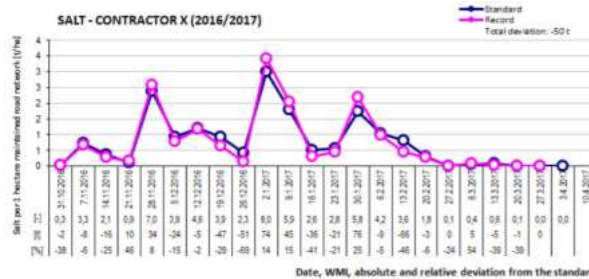
Performance reporting



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 700 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



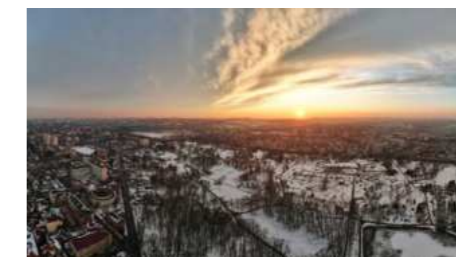
Czech Republic
Nationwide road weather system



Valteřice, Czech Republic
Road weather camera 2DRoad



Bulgaria
Establishing an RWS network



Moldova
Network of weather stations at key points on the motorway and road network

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*.

2DRoad is a unique sensor that provides detailed information about the condition of the road surface. Unlike other non-invasive sensors that focus on only one point or a small area of the road, *2DRoad* is capable of simultaneously monitoring 4,096 points in an area up to 6 × 6 m. For each of these points, it can determine whether the spot is dry, wet or covered in snow or ice. The road surface temperature is measured at a point approximately in the middle of the sensed area.



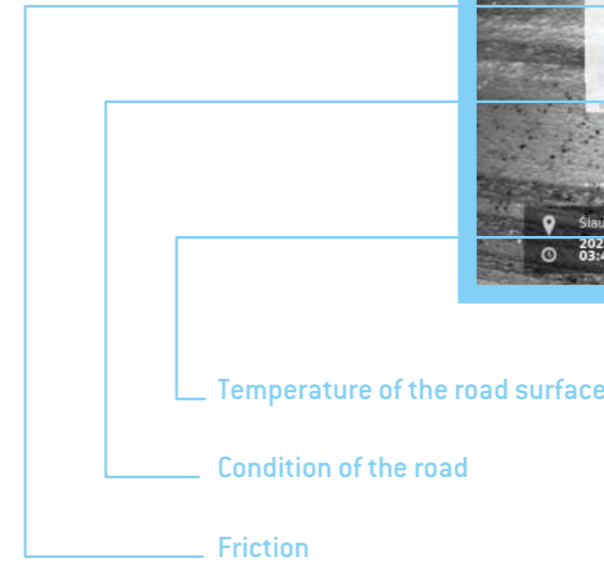
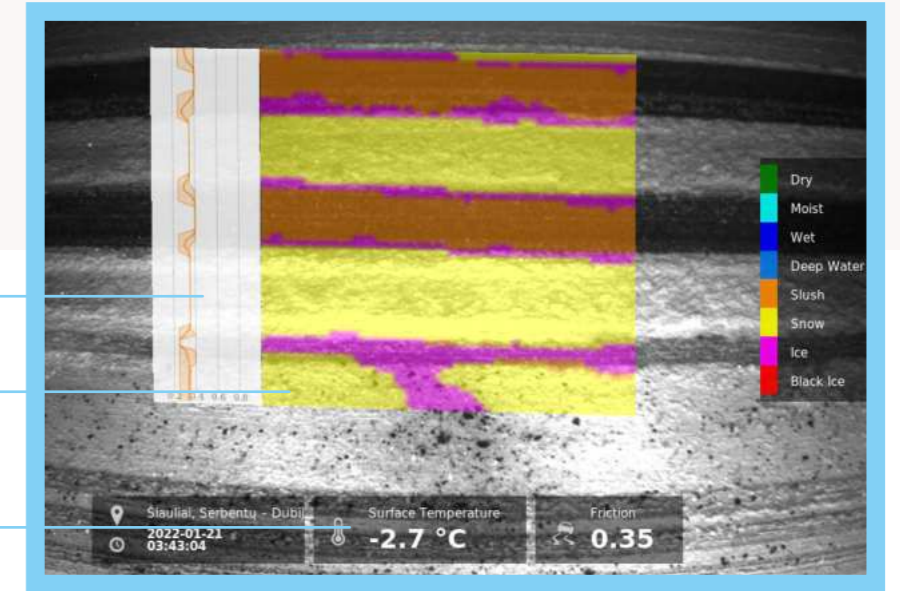
Road weather camera



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

 **MetSense**

www.metsense.com



MOBILE LASER SENSOR

MetRoad Mobile

MetRoad Mobile is a mobile laser sensor for monitoring road surface conditions. It can distinguish 7 conditions (dry, wet, deep water, slush, snow, ice) and can calculate the height of the water layer on the road and the slipperiness between the wheels of the vehicles and the road. An essential accessory of the sensor is a datalogger with 4G connectivity and a mounting bracket.



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