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Product Spotlight

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Vaisala Thermal Mapping

Ice prediction systems for improved deployment of resources and increased driver safety

For road and airport authorities, deploying winter resources in a timely and accurate manner is imperative to prevent snow and ice-related incidents. Road and runway surfaces may form ice at different rates throughout a network due to topography, land use, heat islands, sky view factor, and construction materials — with temperatures varying up to 10°C/18°F within the same region.

Measuring road surface temperature is key to creating models that predict which sections of a road network will form ice, yet road and airport authorities often do not have the capability to measure this. When combined with weather station data, Thermal Mapping provides a network-wide view of forecast (or actual) road surface temperatures.

Vaisala's Thermal Mapping service allows authorities to identify sections of a road or runway network that could become dangerous in winter weather conditions, allowing for fewer disruptions in services during winter months. Resources can then be allocated to critical sections of the network to help prevent vehicle accidents and maintain safe surface conditions.

Key benefits

Coldest parts of a network prioritized

Thermal Mapping allows authorities to identify which sections of the road or runway are likely to freeze first with the thermal profile, giving statistically accurate surface temperatures throughout the network. This enables authorities to be proactive with resource allocation to maintain safe driving conditions. The information can also be used to design maintenance routes to enable selective treatment application.

Greater understanding of dangerous stretches

Thermal Mapping data can be combined with traffic, accident, and other weather data to provide authorities with a deeper understanding of why certain parts of a road network are more accident-prone. This enables highway engineers to take proactive steps to mitigate risks on dangerous stretches of roads.

Forecast & time-step thermal maps

Access to a dynamic network-wide map that displays minimum road surface temperature and a time-step view shows how road network temperatures vary overnight. Vaisala's Thermal Mapping allows users to see data no matter where they are and helps to deliver forecasts in a more effective format.

Thermal Mapping at a glance

Applications

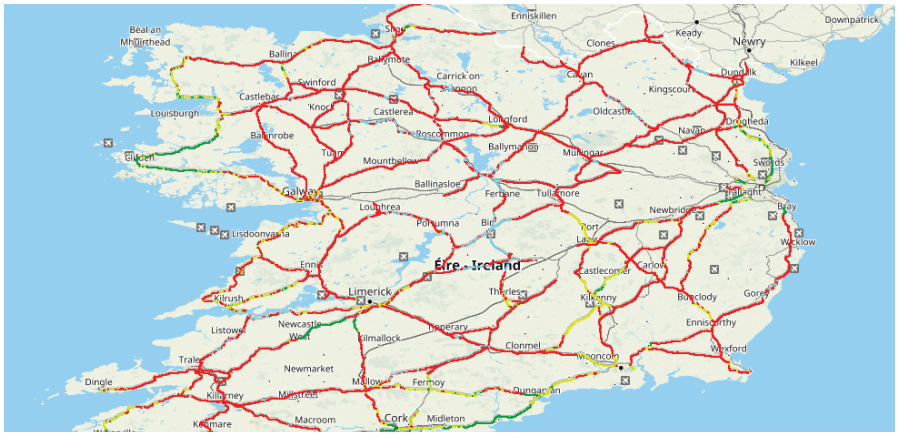
- **Ice prediction system**
  Create a more accurate ice prediction system for road and airport authorities. Road surface temperature, as well as additional forecasting information, is used to create a model that can help identify sections of the road network where ice will form.
- **Optimal weather station placement**
  If weather stations are placed improperly throughout a road or runway network, authorities will not have access to the right information to make proper decisions. Thermal Mapping can help authorities determine the optimimal number and location of weather stations.

Key features

Vehicle-mounted infrared thermometers detect the spatial variation of road surface temperature. Air temperature is not a good indicator of road surface temperature, which is why Vaisala deploys infrared thermometers to take direct surface measurements.

Thermal Mapping surveys are conducted across the network under a variety of weather conditions. The weather must be stable for 2-3 hours before and throughout the survey to obtain usable data. These surveys are usually conducted between 23:00 (11:00 p.m.) and dawn, when the minimum road surface temperature is likely to occur.

Time-step Thermal Maps show when sections of the road or runway will reach a critical temperature (freezing point or operational threshold) by delivering an hour-by-hour representation of a Thermal Map to identify expected road temperature changes.



Why Vaisala?

Weather expertise and innovation

Vaisala has more than 80 years of highly accurate weather observations. For decades, road maintenance agencies all over the world have trusted Vaisala to deliver a full-service offering for measuring the weather. Vaisala's Thermal Mapping process is the only proven and established method to determine surface temperature relationships across a road or runway network. The technique is continually updated for reliability and accuracy, with results published in scientific journals regularly.

Support and services you can count on

With a deep understanding of the challenges faced by winter maintenance decision-makers, Vaisala has been working with more than 300 groups around the world to create accurate ice-prediction systems. Building on decades of experience providing the best technologies and expert know-how, Vaisala's philosophy of partnership is unmatched in the industry.

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www.vaisala.com/thermalmapping

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