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Topic:
Emerging technologies

Title:
Technological advancements in acquisition of weather data and detection of road surface condition.

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Abstract:
Road surface conditions in winter are a main cause for accidents and traffic jams, which apart from causing human distress also lead to high economic costs. The collection of reliable data directly from the street in order to support maintenance decision process of the winter road service is a substantial contribution for improving safety and mobility.

With regards to modern road weather information systems RWIS it is important to be able to rely on a technological approach that combines easy installation, reliability, accuracy and easy service with low live time cost so that the necessary coverage of the measurement grid is ensured.

There are innovative measurement procedures, like the measurement of the different kinds of precipitation as well as the intensity via a Doppler Radar method, which is operating in the microwave-range. This method avoids the disadvantages of optical or mechanical methods, which are otherwise currently used. Microwave-radar methods are also being used when measuring the coverage of the street surface and are reaching accuracies which have not been obtained with the use of other methods.

Apart from the decisive progress of the measurement procedure itself, all relevant atmospheric measurement parameters (air temperature, dewpoint, precipitation, wind and pressure) have now been integrated in one compact and intelligent measurement unit.

The same applies to the road sensor which is built into the road surface. That is how it is possible to construct a complete road weather station out of only 2 sensor devices. The intelligent measurement instruments supply all measured data via a digital (serial) standard interface in the required measurement units, which in turn do not need further link processing or interpretation. Through this open standard data communication this new compact and smart technology can be integrated independently from the manufacturer into applications like MDSS or ITS as well as it can be integrated into various systems architectures.

On top of that there are compact energy saving communication modules, which are connected via a field bus and which support all common international data protocols (TLS, NTCIP, XML etc..) and which can be joined via various communication media such as (LAN, WAN, GPRS, UMTS, GSM etc.). The article describes the basic concepts of intelligent measurement procedures and the main technological progress in the area of modern road and weather data collection.

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