



## **Road Weather Information for Different Customer Groups - Case Finland**

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### **ABSTRACT**

Road network availability in Finland is at very high-grade in the winter also during bad road weather conditions because of an effective utilisation of road weather information in winter road management. Road weather data in Finland is based on road weather monitoring stations and road weather cameras. Road weather data is combined in Road Weather Information System with data from weather radars and weather satellites. In addition to observed data and calculated parameters based on data there are shown road weather and rain forecasts in the system.

Customers of road weather information services can be split up road maintenance professionals, road users and service providers of value-added services. Typically road maintenance professionals in this area take care of winter maintenance activities on roads or traffic information services for road users in traffic management centres. Road weather information for road users provided by road authority is focused mostly on traffic safety, traffic fluency and incidents on roads. Increasingly the information for road users is also provided by service providers of value-added services. Finnish Transport Agency with ELY Centre for Southeast Finland provides road weather information for these customers with various contents.

**Keywords:** Road Weather, Information, Customer, Service, Finland

### **1 INTRODUCTION**

Finland is Europe's fifth largest country located in Northern Europe. The seasons in Finland differ a lot from each other. In summer the country's highest temperature is typically more than +30 °C, whereas the lowest temperature during winter is typically less than -40 °C [1]. In spite of that people live all over the country all over the year with a daily need to travel to work, school, shopping or leisure activities.

In the winter, when roads are snowy or slippery, there is a need for winter maintenance activities on the whole road network. Road weather information services has been developed to make winter maintenance operation more effective and to increase people's knowledge about existing and upcoming road conditions too. Because of an effective utilisation of road weather information in winter road management, road network availability in Finland is at very high-grade also during bad road weather conditions in the winter.

ITS (Intelligent Transport Systems/Services) for Finnish National Roads in Centre for Economic Development, Transport and the Environment for Southeast Finland (ELY Centre for Southeast Finland) has organisationally the responsibility of planning, maintenance and implementation of intelligent transport systems (ITS) and information services for Finnish national roads all over the country. Road weather information system is one of these ITS systems operated by ITS for Finnish National Roads. ITS for Finnish National Roads is a part of state administration and it employs almost twenty technological specialists who purchase different services from market by competitive bidding.

## 2 ROAD WEATHER INFORMATION INFRASTRUCTURE IN FINLAND

A simplified road weather information concept consists of information sources, information systems and information services. Information sources can be divided into sources owned by administration and information purchased from other organisations. Road weather information in Finland is based on road weather monitoring stations and road weather cameras. Information sources like road weather monitoring stations, traffic monitoring stations and road weather and traffic cameras in Finland are owned by administration. ITS for Finnish National Roads takes care of these monitoring stations and cameras on the Finnish main road network. In addition to that ITS for Finnish National Roads purchases information like weather radar service, weather satellite service and road weather forecast service from other service providers.

On the Finnish national road network there are about 380 road weather monitoring stations and about 570 road weather and traffic monitoring cameras. Road weather monitoring stations have sensors including state of the road, air and road surface temperature, humidity, dew point, wind speed and direction and intensity and accumulation of precipitation. Road weather monitoring observations are made at intervals from 5 to 60 minutes depending on weather and road weather conditions and current season.

Road weather cameras are used primarily on supporting winter maintenance activities. In addition to that road weather cameras in many cases are also utilized for traffic monitoring, especially on jammed road sections and road sections equipped with traffic management systems. Traffic cameras are used for live monitoring of traffic situation. They are reversible and they can be zoomed depending on the traffic operator's needs. For road weather monitoring purposes the cameras take pictures typically at intervals from 5 to 20 minutes.

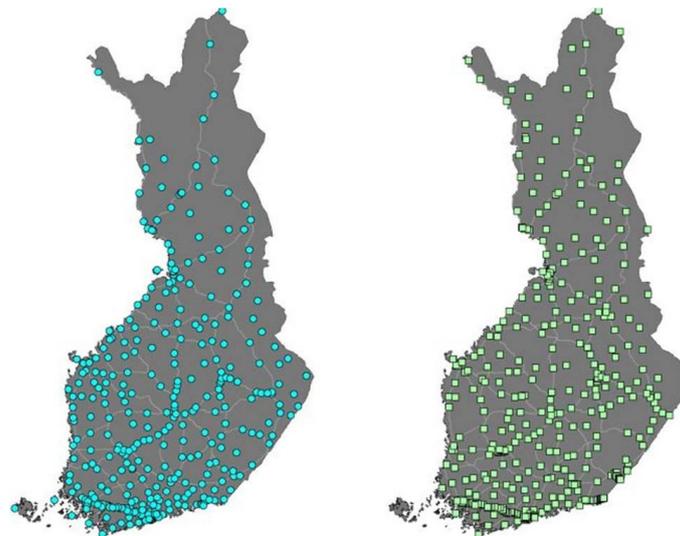


Figure 1. Road weather monitoring stations (on the left) and road weather and road weather monitoring cameras (on the right) in Finland.

## 3 ROAD WEATHER INFORMATION UTILISATION

### 3.1 Customer groups

Customers of road weather information services of administration can be split up into road maintenance professionals, road users and service providers of value-added services. Typically road maintenance professionals in this area take care of winter maintenance activities on roads or traffic information services for road users in traffic management centres. A largest customer group of road weather information is road users. Road users cover not only car drivers but also professional drivers and all other movers on the road network. They can use road weather information beforehand when making decisions for their trip or during the trip. In bad road conditions road users should think for example if the trip is absolutely necessary or if they can start the trip during better road conditions? During the last few years, service providers of value-added services have taken a more important role in tailor-made services for road users and other customers especially for mobile devices like smart phones and tablets.





Road Conditions Service is based on data from road weather stations, general weather information, weather radar information and weather forecasts. With these source information and road conditions model, the service produce information about current and forecasted road conditions. Road conditions information, road weather information and weather radar information provide a general view of road conditions for road users. With this information drivers can prepare themselves beforehand for possible problems caused by bad road conditions during the trip. Road Conditions Service is useful for professionals, too. The road traffic management centres use the service for traffic information service. The road conditions centres for road maintenance use the information when supervising winter maintenance activities like ploughing and antiskid treatment. The Road Conditions Service has three user interfaces: personal computer, tablets and smart phones. The service is available in three languages: Finnish, Swedish and English (<http://www2.liikennevirasto.fi/alk/english/keliennuste/>).

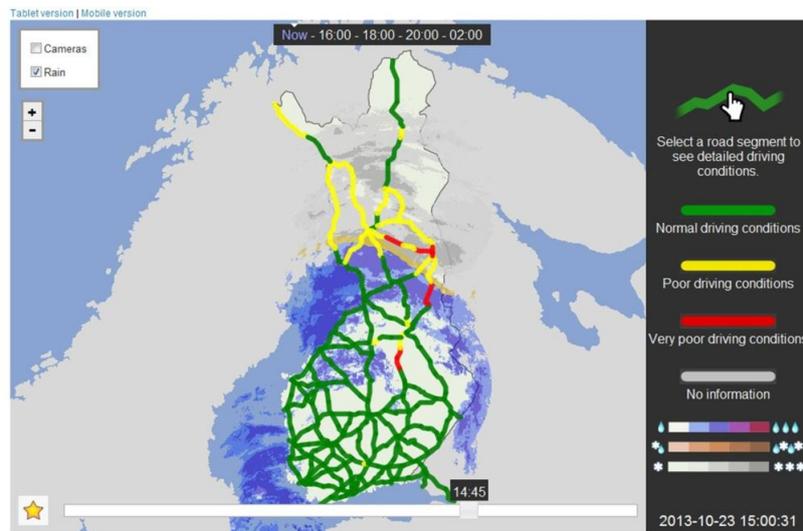


Figure 3. User interface of road condition service.

### 3.3 Service providers of value-added services

Increasingly the information for road users is also provided by service providers of value-added services. Finnish Transport Agency with ELY Centre for Southeast Finland provides traffic and road weather information for these customers via Digitraffic. Digitraffic is a service offering real time and historical information and data about the traffic and road weather on the Finnish main road network. Service providers of value-added services get data from administration for free. In connection with road weather information current data of road weather monitoring stations, real-time pictures of road weather cameras and road conditions forecasts are available by Digitraffic. So far ELY Centre for Southeast Finland has made Digitraffic contracts with over 90 organisations.

## 4 CONCLUSIONS

In Finland it is considered very important to provide road weather information for different customer groups not only the professionals but also other users of information. Data collected and information are worth using effectively for various purposes. Administration grants the right of use the Road Weather Information System equally for road maintenance contractors and road management centres to ensure uniform quality of road maintenance all over the country. On the other hand Finnish Transport Agency's Traffic Management Centres use the same information for traffic management and information.

For road users Finnish Transport Agency with ELY Centre for Southeast Finland provides traffic and road weather information in order to improve traffic safety, traffic fluency and comfort of travelling. In Finland administrations give public data to service providers of value-added services according to open data principles so that they can create new and innovative solutions to utilize the data for services for different devices.

## 5 REFERENCES

- [1] Finnish Meteorological Institute. The warmest and coldest place annually. Available from: <http://ilmatieteenlaitos.fi/lampimin-ja-kylmin-paikka-vuosittain>. [15 January 2014].