

Road Weather Service Operation Platform for Traveller and Traffic Information

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SUMMARY

In cooperation with BMW Research and under the framework of the Bavarian federal states traffic information agency a service platform was developed. For example, among other features, the platform provides TMC coded warnings and messages on small sections of roads and support different geographical references. The so called RWS-TTI server is able to process different types of weather and road condition source data, with various time schedules and different type of geographical references, by means of an adaptable knowledge base. The system is also designed to process spontaneous transmitted extended floating car data (XFCD). Under the EU project "eMOTION" new concepts of meta data models are defined, based on ISO 191xx standards and also derived from DATEX II. The use of GML / XML schemata and documentation standards UML 2.0 makes the platform open for Europe wide applications in order to enhance the safety of traffic and improving the winter maintenance performance. The contribution explains the structure of the platform and presents so far experiences and results of the service and quality measures.

1. INTRODUCTION

Road Weather information systems became more and more indispensable and important for supporting winter maintenance decisions. Winter maintenance decision support makes the highest demands on quality and range of measurements, information and forecasts. This highly sophisticated data should also be used for traveller and traffic information. Road weather information systems are part of the road infrastructure and the telematic field.

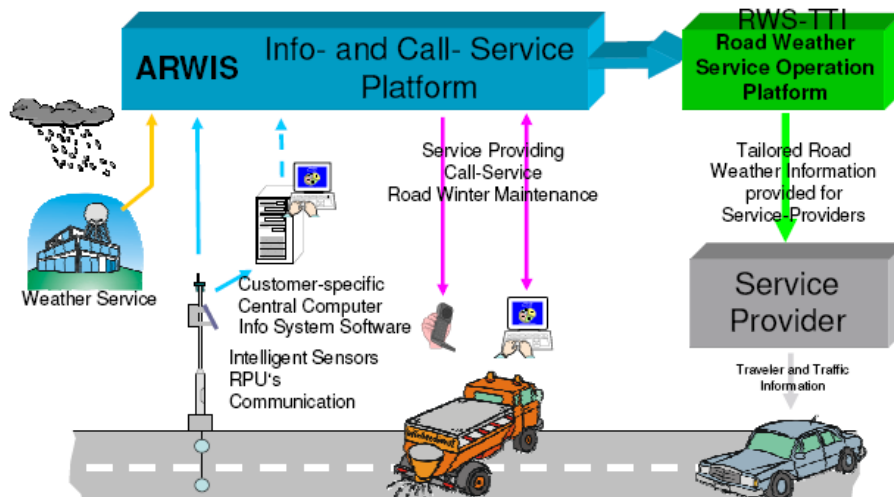


figure 1 Road Weather information Policy

The field of Road Weather Information comprises the following issues: Weather Services dealing with global atmospheric weather data and forecasts, the road weather remote stations acquiring all weather related road condition data, the road weather information central computers or comprehensive information and decision support services for the road maintenance organisations and also road weather content- and service- operation platforms for traveller and traffic information purposes. In the future extended data from moving vehicles could also enhance the coverage of the road network and improve the winter maintenance services.

2. ROAD WEATHER SERVICE OPERATION PLATFORM

Weather incidents like thunderstorms and strong showers, fog, chilling humidity, and snowfall represent serious safety risks on roads. Local thunderstorms will inevitably lead to a prolongation of travel time. Appointments cannot be kept; individual stress and the risk of accidents are rising. Sleekness caused by rain, snow and ice is playing a vital role in about 30 % of all accidents within Germany and similar situations are discovered in other European countries. This risk can be reduced by accurate, road related warnings of unfavourable weather and road conditions.

Therefore a road weather information platform was developed by micKS MSR GmbH under support and cooperation by the BMW Group FIZ and also in cooperation with the T-Traffic company ddg GmbH (→ [1]).

This service operation platform is able to process different meteorological and road weather data sources, which also can have various time and geographical references and producing TMC coded warnings and messages referenced to short road sections based on digital map links or TMC locator. The fusion of various data sources is achieved by a knowledge base (see also figure 2).

The mobile Traffic information service provider T-Traffic and ddg now operates regularly a version of the platform under license provided by micKS company. Another application for the weather Server is the Bavarian Traffic Information Agency (VIB) established by the Bavarian Interior Ministry and by a consortium of private companies (Siemens AG, PTV AG, micKS MSR GmbH, mdv GmbH). The system build up will be shortly finished. The contract duration is 10 Years (see also [3]).

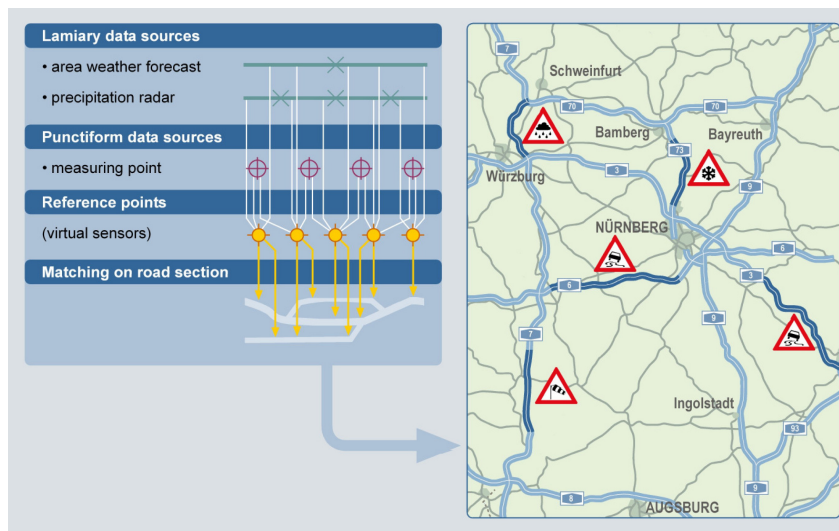


figure 2 different geographical referenced data sources are processed and mapped to road sections

2.1 Road weather service operation platform in europa-wide multimodal on-trip traffic information

Under the framework of the EU project eMOTION (= Europa-wide multimodal On-trip Traffic Information – see also [4]) also for the weather platform europa-wide interface standards and data models were specified.

Road weather information can play its role in a Europe-wide traffic information network. As an example see figure 3.

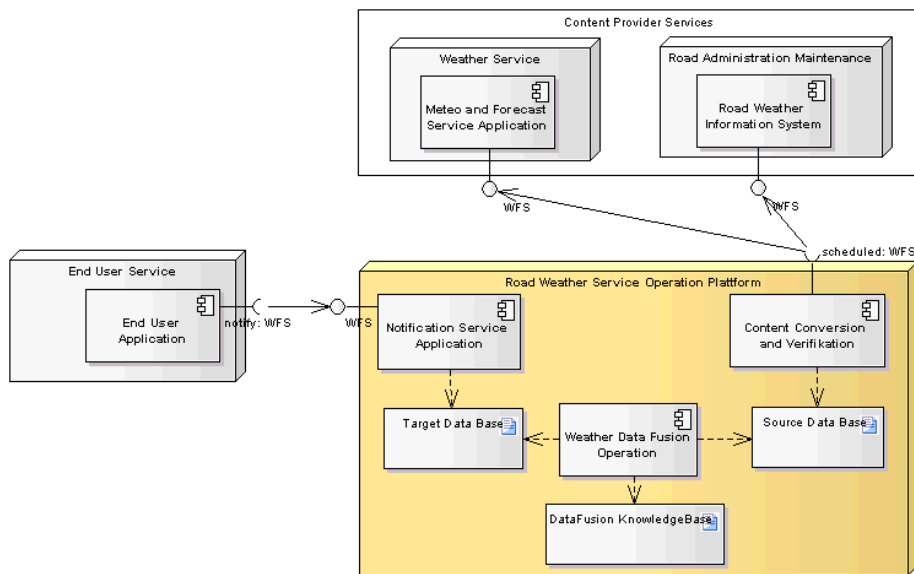


figure 3 UML Diagramm: Road weather service operation platform in a emotion service network

Data sources of different content providers are acquired from the weather server by means of standard emotion interfaces (like WFS = Web Feature Service) and data models following the ISO 191xx and DATEX II standards. The service operation platform delivers service data ready to use for service providers, who run end user applications. The service providers are in charge of distributing the service information to mobile end user devices and handle the business related affairs.

The emotion framework also include registry services, where interested service providers or other potential customers can ask for available content or service operation platforms. On the registry a customer can obtain all necessary meta data (see also [2]) information about the available sources as well as information about the licence conditions under which the provider is willing to sell their content. Digital rights management services are also provided by the emotion group.

2.2 Extended floating car data gain coverage of road condition content

Data from the floating traffic can gain the coverage of data sources evidently. The BMW Group FIZ has started the development of extended floating car devices (XFCD) with the capability of collection all data from various sensors and systems in a vehicle in order to report critical situations during the drive. For example heavy rain

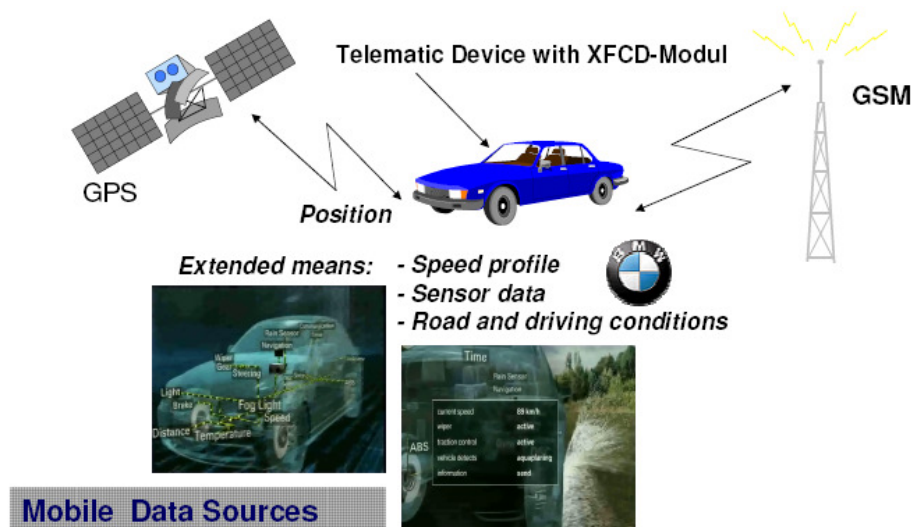


figure 4 XFCD Extended floating car data principle

from the built in wiper rain sensor, aquaplaning and slippery conditions from the behaviour of the ABS and so on. These reports are transferred by mobile communication network. The data processed by a central content Server can be also valuable for winter maintenance decision support services.

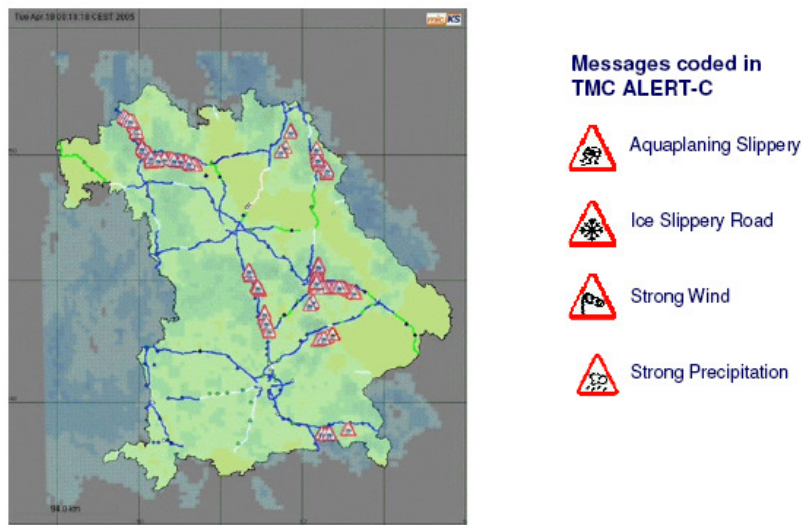


figure 5 Example of active TMC messages on highways in Bavaria

The platform did not provide user interfaces like websides etc.. The service provider is responsible for it. The figure 5 shows the visualisation on a platform monitor of a certain weather situation. TMC Messages are displayed as icons, the condition of the road is shown as coloured sections. Overlay information can be provided for example the precipitation radar picture.

2.3 Quality management of information service

The only way to get an “over all” quality check is to collect reliably observations from experienced people and experts and compare them with the output of the information platform. On example of an observation from a driving car shows figure 6: heavy rain was detected only in a short section (ca. 2 km) on the highway near Oberpfaffenhofen, Bavaria, which was really encountered. There was also a rainy situation in whole southern Bavaria but the intensity was under the warning limits – except in this mentioned section.

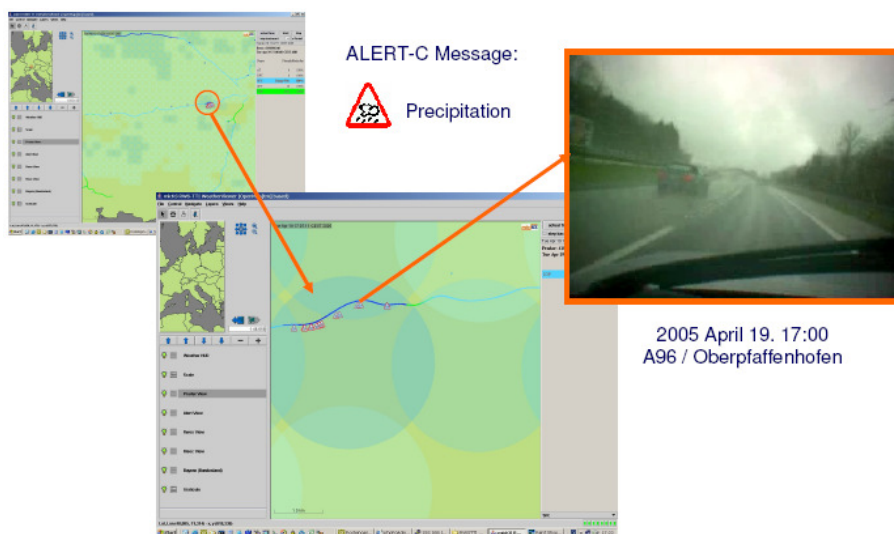


figure 6 Example for a observation from a driving car.

To meet the high requirements of a premium service, in the past BMW run several automatic quality measurement and evaluations, based on defined quality scores for message and service quality. For that purpose, data from surveying and probe collecting tours by XFCV vehicles from BMW are summoned.

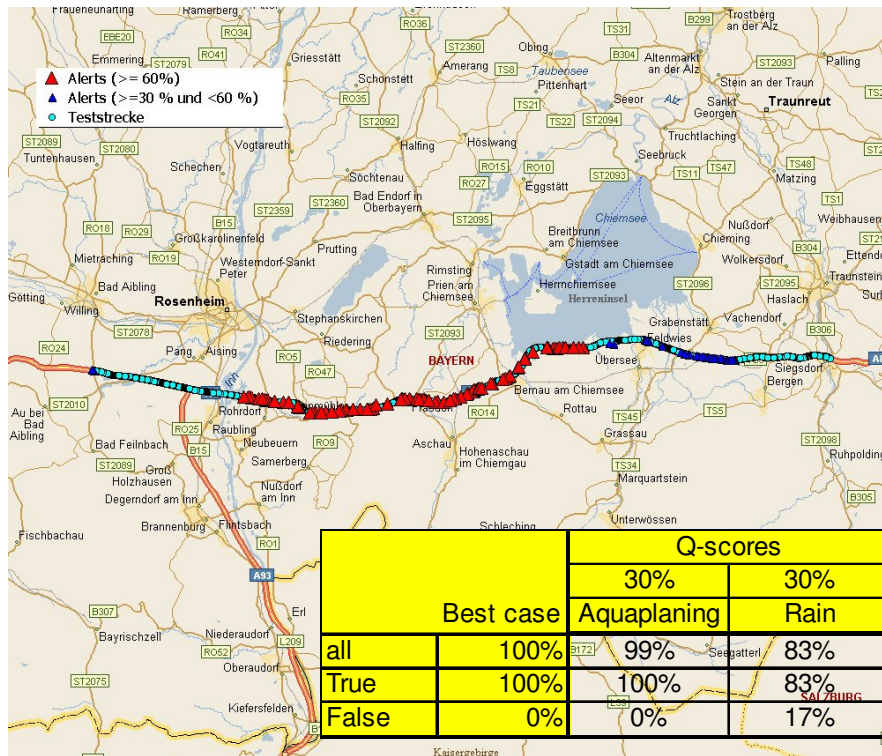


figure 7 visualisation of a surveying tour and some results

3. CONCLUSIONS

Weather information, especially road weather become more and more important for traffic safety. Road weather information systems are an essential part for road maintenance decision support. The immense progress in road environmental sensor devices and in forecasting of weather situations not only useful for maintenance but also for information to vehicle drivers. Future technologies such as extending floating car data and the dissemination of board computers and navigation devices can also gain new data sources for maintenance.

Future research will have their focus on automatic consideration of weather and road surface condition in traffic situation forecast in order to control the traffic and also for logistic application in the transportation industry.

4. REFERENCES

- [1] Road Weather Information – A new approach to enrich driver information, Martina Neuherz, Georg Obert, BMW-Group FIZ, Munich Germany, ITS Congress London, 2006
- [2] eMOTION System – Technical Specification, eMOTION Consortium, 2008, Deliverable D6 + Appendices, → <http://www.emotion-project.eu> → DOCUMENTS
- [3] VIB Verkehrsinformationsagentur Bayern, OBB, Siemens, PTV, micKS, mdv, 2006 → www.bayerninfo.de
- [4] Europe-wide multi-Modal On-trip Traffic Information (eMOTION), eMOTION Consortium, Ing. Tomáš Stárek, Doc. Dr. Ing. Miroslav Svítek, Ing. Tomáš Tvrzský, ITS Prague, 2007, Postersession → <http://www.emotion-project.eu>