

Implementation Issues for Extended Environmental Information

A System description

The idea of the floating car data is to monitor individual vehicles to gather data concerning the whole road network. The in-vehicle equipment records the location of the car, speed and possibly other information such as acceleration and sends the recorded information to the central system or to other cars. The central collected data can be used as content for different applications and services. Floating car data can also be implemented as a decentralised system as in the German FleetNet project.

B Technology Availability

The technology needed to implement floating car data systems exists. There have been several implementations with varying features. Trials have been carried out in Europe, USA and Japan. Technological solutions such as the wireless communication and location systems used vary from one case to another. In addition to speed and location, many other kinds of information can be collected. First Floating Car Data Systems transmitted travel times and locations out of range-outs or time-outs. Enhanced methods compares the onboard travel times with expected travel times to transmit only travel times which exceed a certain threshold value. Different kind of sensors can be mounted in the car and the results of measurements transferred. In modern vehicles numerous control devices and subsystems generates data which can be used by intelligent algorithms to detect traffic states and safety relevant events and situations (Extended Floating Car Data – XFCD). For example, the operation of ABS brakes can be used to detect slippery road conditions.

C Road and Information Infrastructure Need and Availability

In case of floating car data no roadside equipment is needed. Satellite location systems and means of communication between cars and central system exist. Usually, the location data is produced by a GPS receiver. In future, the corresponding European system called GALILEO will offer better performance compared to GPS. GPRS, GSM, UMTS, WLAN can be used for wireless communication. At present, GPRS is widely available and offers packet switched data connection which is cheaper to use than circuit switched GSM data.

Methods for the data fusion of the data from different sources (stationary, floating car) are needed. And centres which receives the various data and where very actual and precise information of local hazards, traffic and road conditions (slippery roads, fog etc.) will be prepared.

D Organisation requirements

The floating car data is collected by individual cars. At least, there should be an organisation which defines standards for the in-car equipment and an organisation to take care of the overall maintenance of the system. The same organisation could also be responsible for the further development of floating car data system. In order to avoid the development of further proprietary systems, it is necessary to found standardization committees in early development stages.

The ISO International Organisation for Standardisation in its Working Group TC 204/Subworking Group SWG 16.3 for vehicle probe data for wide area communication is

already working. Their new work item proposal contains “Architecture, Basic Data Framework and Core Data Elements”

E Regulatory Requirements / Barriers

Data protection and privacy issues should be dealt with when the system gathers data on the movement of individual vehicles. Questions related to the ownership of the data collected must be answered before starting the implementation.

F Business Case / Customer awareness and Acceptance

Monitoring traffic with conventional roadside equipment is costly. Floating car data could be another way to produce real-time data for traffic control purposes. A part of the cost could be paid by the authorities while the other part can be recovered by the value of real-time services (such as prediction of travel times) offered to the public. In addition, the business model chosen should be feasible with the technology used. New Generation of extended floating cars will transmit only data which are relevant to know in the centre: e.g. detected slippery conditions on the road, congested traffic with precise located congestion fronts and weather related visibility obstructions (fog, snowfall). To avoid unnecessary repetition of in-vehicle message feedback-channel-referencing has to be implemented. Every message send over air (digital audio broadcast-DAB, traffic message channel-TMC) into the vehicles contains what the centre already knows and did not need to get informed. An intelligent message management in the vehicles with feedback channel referencing will keep the number of send messages explicitly low.

G Key Success Factors

One of the most crucial issues is, who will pay the costs and why. There should be a valid business model or a way to share the costs between different parties concerned. Data protection and privacy issues should be taken account when designing the system to minimize the potential for abuse the data collected and to ensure the user acceptance.

Important is to send all Floating Car Data of a geographical area into one data pool in order to get the highest quality of content for the services. It doesn't make sense to have numbers of data pools, each with some data.

H Feasible Deployment Strategies

To get relevant information about the state of the road network about 5-10 % of cars should be equipped with in-car equipment used to collect floating car data. This requirement is easier to meet when the geographic area is limited. Before the large-scale deployment the technological solutions and business models should be tested in practise. At first, when there are only few vehicles with in-car equipment, the floating car data should be used together with data collected by other means such as roadside detectors. Methods for the data fusion of the data from different sources (stationary, floating car) are needed.