FCD-Webportal

- Quality Assessment Tool for Bavarian Motorways -

Costumer and Task

The Center for Traffic Management at the Bavarian Road Administration aims for solutions and concepts for an environmentally and incident-free traffic management with high quality of traffic flow and low travel time losses at Bavarian Motorways. Following this goal a network wide overview of the quality of traffic flow is needed to:

- Recognize and remove bottlenecks
- Prioritize measures of development and traffic management based on their cost-effectiveness
- Evaluate the impact of measures

Methodology

Fulfilling these needs a software-system is developed, which uses vehicle speed and position data, so called Floating Car Data (FCD), to calculate section-related performance indices for traffic quality and present these results in tables and graphs for freely selectable traffic situations (single days, workdays, weekends, travel days, big events, etc.) The result is a web-platform for all organizational units at Bavarian Road Authorities.

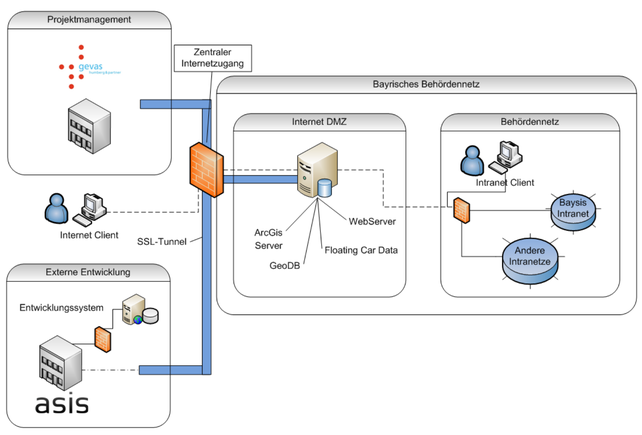

Fig. 1: Network structure

This web-platform includes:

- Floating Car Data of ADAC
- Detector data of the Free State of Bavaria
- Network model and ESRI-based maps of the Bavarian Road Information System (BAYSIS)

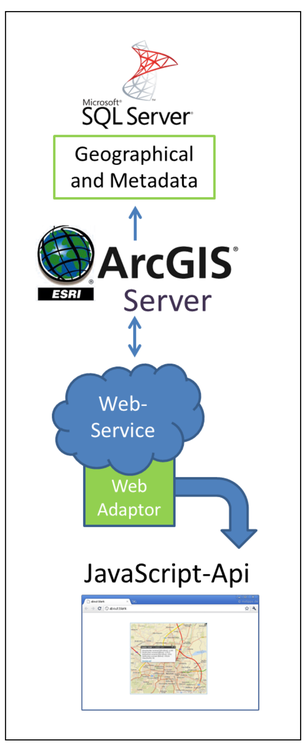

Fig. 2: Data Processing with ArcGIS

Solution

Using the gevas humberg & partner generated procedure **FloCaDA** (Floating Car Data Analysis) the FCD are georeferenced to the network model. For Visualization of the metadata an ArcGIS-Web service and a Java Script API are used.

The data processing procedure is able to realize the whole workflow for FCD-data of one year shortly (the import of more than one million data sets, the georeferencing and the calculation of indicators). **FloCaDA** is offering a uniform calculation method for quality indicators for the whole Bavarian Motorway Network.

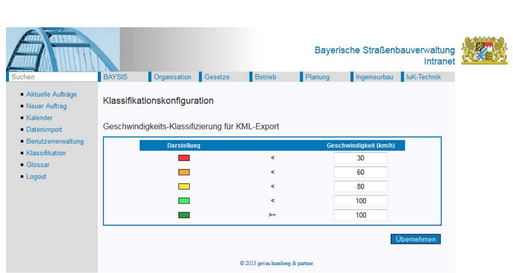

Fig. 3: Basic parameters for definition of speed classes

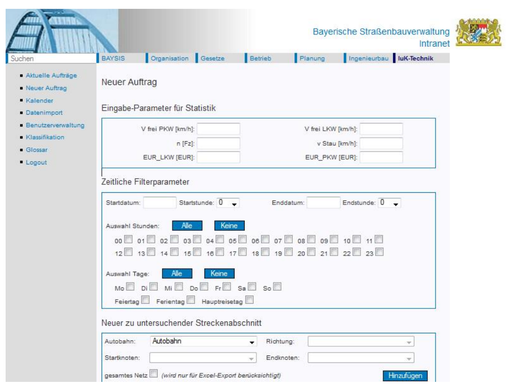

Fig. 4: Input Screen with parameters for report tasks

Results

The procedure FloCaDA is able to identify clearly traffic jams and provide reliable travel times and travel time losses at motorways. The location and causes of congestions are determined and spatio-temporal located. Bottle necks in the road network are identified more precisely and this information can be used better for the planning processes of traffic management strategies. For infinitely variable time periods at least the following indicators are calculated:

- Time loss
- Costs of congestion
- Mean duration of congestion
- Length of congestion
- Level of Service (LoS)
- Mean travel times

Additional features are user and access administration and export interfaces for Microsoft Excel and Google Maps. The quality of the method and the software are tested successfully using reference measurements. Since 2014 the software is in productive use.

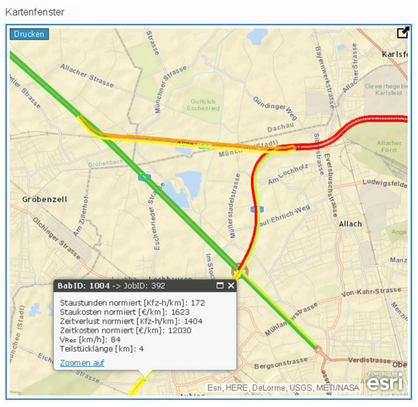

Fig. 5: Representation of Quality of Service in ArcGIS (including detailed information) [Sources: Network data: BAYSIS; map: ESRI]

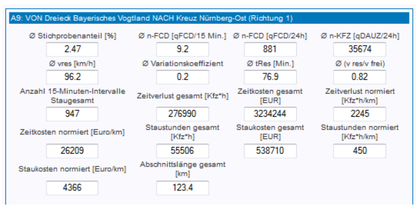

Fig. 6: Output summary of calculation results

Fig. 7: Representation of FCD-single point messages for congestion detection [Source: Google Maps pro]

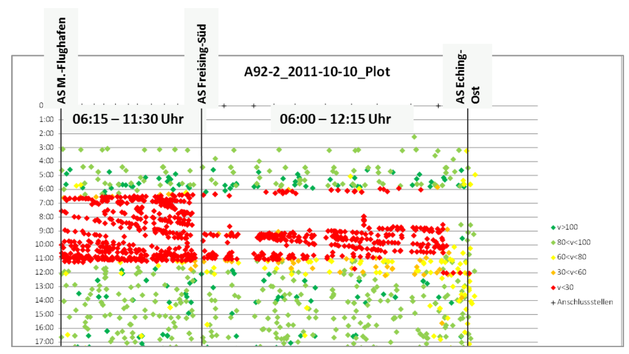

Fig. 8: Path-time-diagram with representation of a congestion event using FCD

Benefits

The outcome of the web-platform can be used e.g. for:

- Prioritization of critical road segments and creation of a hierarchy of needs of action
- Evaluation of congestion costs
- Impact assessments of infrastructural or traffic management measures

The main benefit of the software is a much better detection and quantification of deficits in the motorway network. So the Bavarian Road Administration is able to create measures of disposal more effective and efficient. Using the results of the procedure it indirectly leads to:

- Less congestions
- Reduced time losses and congestion costs
- Decreased number of congestion related accidents
- Reduction of negative environmental effects of noise and pollution

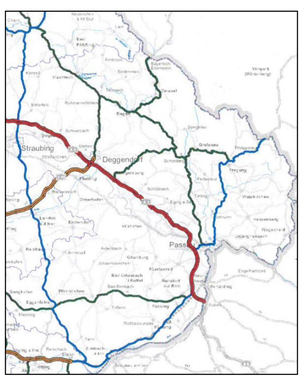

Fig. 9: Primary (orange, red) and secondary road network (green, blue) [Source: BAYSIS]

Outlook

Future activities are:

- The integration of the secondary road network
- The inclusion of more FCD sources

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