Interreg CENTRAL EUROPE

Co-funded by the European Union

TRANS-BORDERS+

Pilot Action developed / improved OJP in the pilot area Saxony - Liberec region

D.2.3.2 – Report

Final

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PILOT ACTION DEVELOPED / IMPROVED OJP IN THE PILOT AREA SAXONY - LIBEREC REGION

Technical Solution and Implementation Report

Content

A. Executive Summary

This report presents the technical solution and implementation of the pilot action developed within the TRANS-BORDERS+ project for the pilot area Saxonia-Liberecký kraj.

During the initial analysis, it was determined that a great deal of important information is available from various partners on the German side, but this is not being communicated appropriately among those involved. An interface also exists that enables data exchange with the Czech side. The first goal must therefore be to consolidate this data and link it appropriately with the Czech side.

Likewise, the real-time data – at least as of the reporting date – is not freely available and fails due to the lack of cooperation from the Czech software provider, who processes this data for the whole of the Czech Republic.

Therefore, a request was tendered out from KORID to receive real-time data on the regional level.

Since the Czech data is currently unavailable, an alternative solution based on data simulations was developed on the German side. This solution can display not only real-time data but also service disruptions or partial service cancellations, detours due to construction work or other operational disruptions, and vehicle utilization. The results of this work were demonstrated in a live presentation during the partner meeting from April 20-21, 2026.

The developed solution is based on data exchange via a GTFS interface but is already designed for the future EU-wide standard NeTEx.

Once the Czech real-time data is available, integration can be easily accomplished at the touch of a button.

As part of the project, initial steps have also been taken to enable data exchange beyond partner region 2 (Saxony / Liberec Region) to neighbouring Czech and Polish border regions.

B. Introduction

Objective of the Pilot Action

The border region in the tri-border area of Germany, Poland, and the Czech Republic has become increasingly integrated over the years. This has also had an impact on cross-border traffic. Work, shopping, leisure activities, and even some school connections take place across the borders. While there are no problems with private motorized transport thanks to new or improved road connections, the development of public transport has been rather slow.

In addition to the rail connections between the German city of Görlitz and the Polish city of Zgorzelec, and the rail connections from the German city of Zittau to the Czech destinations of Liberec and Varnsdorf, the first TRANS-BORDERS project also aimed to initiate sustainable developments in bus transport. During and after the project, the cross-border and fare-separate bus line "P" between Görlitz and Zgorzelec was integrated into the Görlitz city bus network, now line "A". This line runs from the station "Landeskronsiedlung" via the central inner-city interchange "Demianiplatz" and the university to the city center of Zgorzelec. Between Germany and the Czech Republic, the three-country excursion route 691, operating on weekends from Hrádek nad Nisou via Zittau, Bogatynia, and Frýdlant v Čechách to Świeradów-Zdrój, and the weekday route 831a between Zittau and Bogatynia were introduced. The availability of the "Euro-Neisse-Ticket" in the region also made it possible to offer passengers an attractive fare option.

What is missing, however, is cross-border real-time timetable information. The TRANS-BORDERS+ project builds on its predecessor project and further develops cross-border, continuous passenger information.

Scope of the Report

The pilot action within the TRANS-BORDERS+ project focuses on improving cross-border journey planning between the involved regions by strengthening the technical interoperability between journey planning systems. In the pilot area Saxonia-Liberecký kraj, the work focuses on the further development of existing real-time traveller information on the German side with similar information on the Czech side to establish a seamless cross-border information system.

Since the overall data situation is different from that in TRANS-BORDERS+ pilot-region 1 (Austria / Slovenia / Italy), an alternative approach is chosen here, which can nevertheless lead to the same result for the customer at the end of the project.

During the initial analysis, it was determined that a great deal of important information is available from various partners on the German side, but this is not being communicated appropriately among those involved. An interface also exists that enables data exchange with the Czech side. The first goal must therefore be to consolidate this data and link it appropriately with the Czech side. The starting point here is completely different, as the target data is available but cannot be freely used due to contractual details.

Likewise, the real-time data – at least as of the reporting date – is not freely available. Therefore, a request was tendered out from KORID. This is also discussed in more detail in the report. Overall, a considerable communication effort is required to bring the numerous partners together and ultimately develop a joint result.

In the further course of the project, the aim is to generate cross-border timetable information not only for sub-region 2 for services between the Upper Lusatia-Lower Silesia Transport Association on the one hand and the Liberec Region on the other, but also to extend this timetable information to the neighbouring areas.

C. Baseline Technical Environment

Existing Journey Planning Systems in the Pilot Area

On the German side, users can access timetable and fare information on the ZVON website. VON itself does not provide the data directly but obtains it externally. Timetable information – both scheduled and real-time data – as well as geodata, come from the EFA server (Electronic Timetable Information Germany) and are forwarded to VON via the neighbouring Upper Elbe Transport Association (VVO) using a JSON server.

The provision of fare data and the design of the website are handled by the regionally based company ISS (Integrated Software Solutions).

Within Saxony (so not only referring to the VON region) there is the MOOVEME app, which consolidates the timetable information for the five Saxon transport associations. This app, in turn, is primarily maintained by Saxony's largest transport association, the Central German Transport Association (MVV) in Leipzig. Here, too, the Upper Lusatia-Lower Silesia transport association is therefore only indirectly involved.

It should also be mentioned that the "Sachsenauskunft" platform was launched in April 2025. With this joint portal, Saxony's transport associations aim to provide a better overview of bus and train journeys in the Free State. The "sachsenauskunft.de" platform allows to search for local transport connections across Saxony and beyond, for arrival and departure throughout Germany. The search accesses the databases of the five Saxon transport associations and provides information in real time. This also shows, for example, delays and cancelled journeys. The information can also be easily integrated into the websites of destinations and facilities in the Saxon-state. This allows interested parties who use these pages to find out about their visit and also display travel options by bus and train. The portal is part of a master plan for tourism.

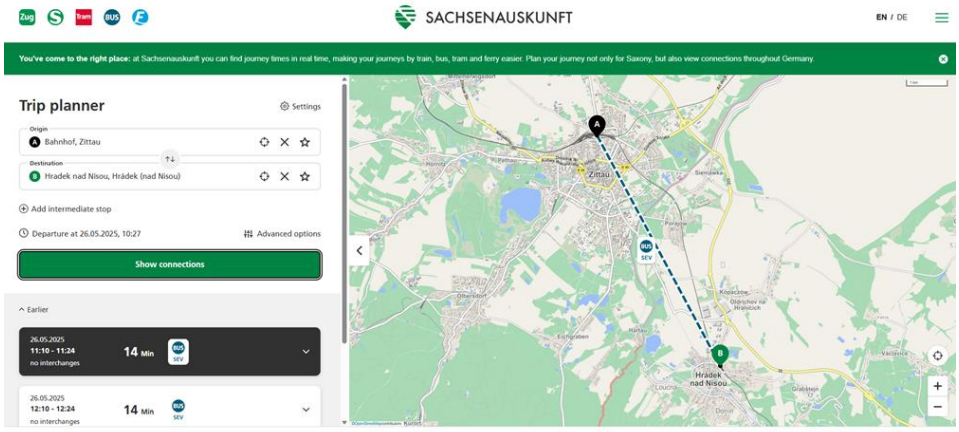

figure 1: screenshot "Sachsenauskunft"

On the Czech side, multiple options of journey planners exist. All of them are fed from the available data that the provider can access. The most popular journey planner IDOS (provided by Chaps) includes all Czech train and bus target data and most of the real-time data CZ-wide for trains and for buses from areas where

they provide the dispatching software MPV net. This is the case of the Liberec region. The international trains are included too. The regional bus lines of the VON area are missing.

IDOS powers the journey planner in IDOLKA – ticketing application. This journey planner is limited to the IDOL ticket validity area. Zittau is included – just trains and lines 691 and 692.

Aside from the IDOS Jízdní řády application or website www.seznam.cz/jizdnirady, the company Seznam provides an alternative connected to the most popular map application, mapy.com. Seznam feeds the data from available sources. Till now, there is no real-time data of the Liberec region except trains (data from Správa železnic).

Regional bus lines of the VON area are included.

Maps Google can be used for limited journey planning in the Liberec region – VON area.

On the Czech side, there are only train data and the Česká Lípa municipal buses so far.

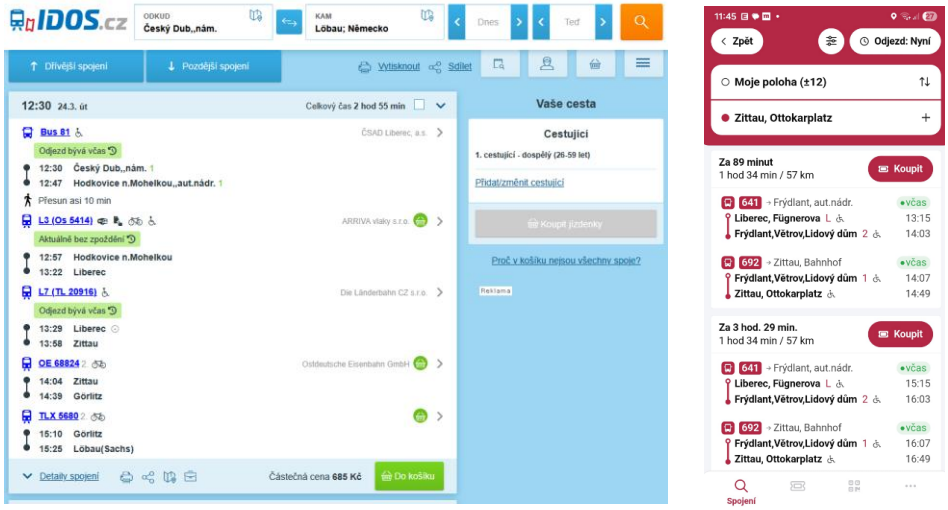

figure 2: screenshot IDOS and IDOLKA journey planner

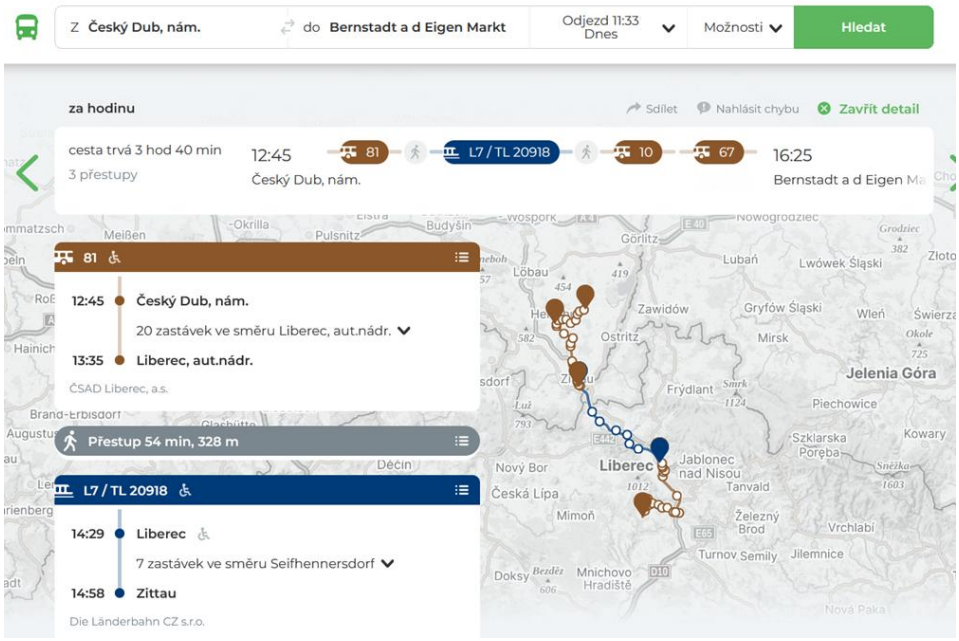

figure 3: screenshot Jízdní řády (Seznam.cz)

Cross-Border Journey Planning Setup

Cross-border timetable information in the VON section

The area served by the VON is located in the border region with Poland and the Czech Republic. In the area of the Czech border, there are transport connections to both towards the Liberecký kraj as well as to the Ústecký kraj. The availability of data varies considerably. Target data from both countries is transferred from ISS to the VVO (Upper Elbe Transport Association) via the DIVA tool from the software company Mentz, Monday through Friday, and updated accordingly.

This applies to bus routes towards the Czech Republic as well as rail and bus routes towards Poland. However, data is not available for all bus routes within the cross-border Euro-Neisse fare zone in Poland.

The situation is different for the cross-border city bus from Görlitz to Zgorzelec, which is fully included in the data of the local Görlitz transport company (GVB). Furthermore, the trains operated by the German company "Länderbahn" to the Czech Republic can also provide real-time data. This applies to the Regional-Express line 2 from Dresden to Liberec and the local line 7 from Seifhennersdorf via Varnsdorf and Zittau to Liberec, which crosses the border three times along its route.

Cross-border timetable information in the KORID section

The transborder connection – bus lines and trains from Liberecký kraj toward Saxony (DE) and Lower Silesia (PL) are fully covered in IDOL target and real- time data set. So they are found in the CZ journey planners.

Trains can be seen in all of the Czech journey planners due to the fact that the national rail infrastructure manager collects and provides the data.

Regional bus lines in Saxony can be seen in the Jízdní řády application from Seznam due to the availability of the target data. Real-time data are not published.

Data Availability and Technical Preconditions

Kommentiert [NH1]: Please summarize this chapter, It is too long. Try to keep it on one page

Data availability in the VON section

Kommentiert [NH2]: Please summarise this section

The data availability on the German side can be summarized as follows:

- EFA timetable information (calculation target timetable, comparison with ITCS)
- Bus companies in the ZVON region (delivery of timetables in PDF-format and handover to ISS)
- Data of bus stops and railway stations (delivery via access database and integration into DIVA)
- Tariff data (delivery via access database and import into Bluepage)
- Company vci (creation of tariff data interface)
- Bahn.de / DB-Navigator (get information via DIVA from ISS)
- ZVON WebApps (is opertated via VVO EFA server)

Data availability in the KORID section

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- Bus service in Liberec Region (target data, KORID LK)
- Train service in Liberec Region (target data, Správa železnic)
- CIS JŘ (gather all CZ target data, provide CHAPS for Ministry of Transportation)
- IDOS (commercial OJP, CHAPS)
- MPV net (Dispatching SW used in Liberec Region, Real time data, CHAPS contracted by KORID LK)

- Tariff IDOL (ticketing data for Liberec Region, KORID LK)
- IDOLKA app (Ticketing app for IDOL, uses IDOS and IDOL tariff data, OICT contracted by KORID)
- www.dopravnimapy.kraj-lbc.cz (Bus stops, Tarif IDOL, routes repository, Krajský úřad Libereckého kraje)
- www.seznam.cz/jizdnirady (commercial map app, maps background and other services)

Limitations related to missing data elements on the Czech side

The situation in the Czech Republic is completely different in comparison to the German side. Here, timetable information is maintained nationwide by Chaps. Chaps is a Czech IT-company based in Brno and develops timetable and route planning systems, such as the passenger reservation system of the Czech Railways.

The company Chaps operates the IDOS-system commercially, which is also resold to interested partners. The Upper Lusatia-Lower Silesia Transport Association has a data exchange contract with Chaps. This contract was concluded in August 2012. It includes the provision of electronic timetable data in the DINO-exchange format for the transport association's area, and Chaps' provision of electronic timetable data in JDF format for the IDOL area, i.e., the transport association in the Liberec Region. This means that the data in easy transferable formats is not held by the transport association itself – as is the case on the German side – but by an IT-company that, for its part, has a primarily commercial interest. In addition, the Czech partner KORID is a transport organizer for regional public transport, who buy back the data to be shown via IDOLKA application to the public from Chaps.

The contract VON - CHAPS only regulates the provision of target data, not real-time data.

Two fundamental issues arise from the interpretation of the contract. Firstly, this contract does not regulate the provision of real-time data. Secondly, the contract is limited to the use of software products within the territory of the Upper Lusatia-Lower Silesia Transport Association, which was correct at the time the contract was concluded.

At a joint meeting in Prague on March 12, 2025, attended by Chaps, the Upper Lusatia-Lower Silesia Transport Association, KORID, and their respective subcontractors, the provision of data was discussed accordingly. It was stated in principle that Chaps can provide data that will also be delivered to the responsible ministries. However, this requires a political directive from the ministries. Unfortunately, Chaps expressed no interest in exchanging data via the commercial IDOS system with the German partners and, in return, in delivering pan-German timetable data to the Czech partners.

Against this background, the lead partner, SMIL (Saxon Ministry of Infrastructure and Regional Development), submitted a request to the Saxonian-Czech Transport Committee. Ultimately, all efforts were unsuccessful.

For this reason, two alternative approaches are being pursued in both parts of the partner region, which are described in the next chapter.

D. Target Technical Setup and Data Architecture

Overall System Architecture

Kommentiert [NH4]: Please make a short introduction about what is planned to do. (Data integration,…)

Simulated data in the VON section

As already described in detail at the beginning of this report, the primary focus lies on integrating the Czech data into the interfaces established for this purpose - as shown in the following figure - in order to provide real-time, cross-border timetable information.

The exchange of target data currently takes place primarily only for cross-border connections and is partly based on analogue timetables.

Due to the current lack of and unavailability of real-time data from the Czech side, it was decided to simulate this data. The following diagram shows the interfaces through which the Czech data will be integrated into the German systems.

All Czech target data will be delivered via standard interfaces. Real-time data from the Czech project partners is delivered via a standard interface. Advantage will be that the existing publication processes remain unchanged (shown in grey), So a fast and simple implementation is possible. Changes to the existing processes are shown in green, which are the GTFS and in future also NeTEx standard for target data import and a new data flow of real-time data into the data hub (ADB). The procedure is compatible with the German VDV guideline 454.

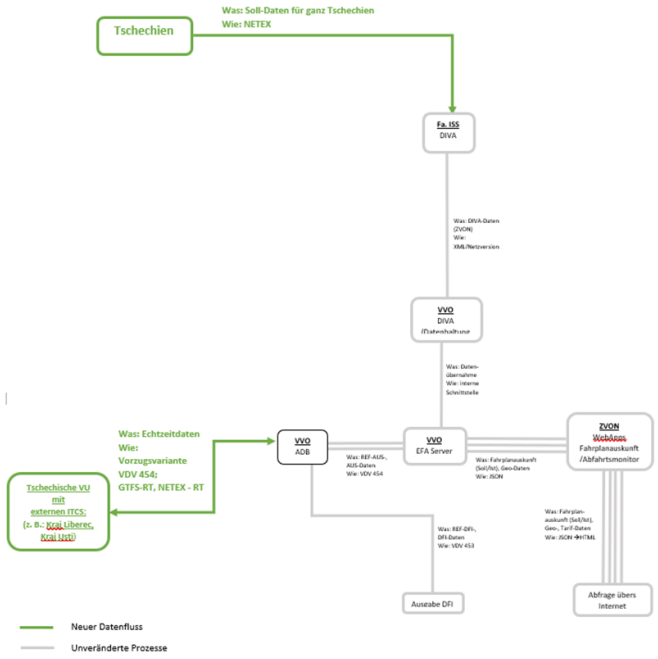

figure 4: Integration of Czech data via GTFS/NeTEx interface

The intended simulation is an interim solution. In case the real-time data of Liberec region from MPV to DIVA would not be set, the real-time data from the Czech partners will be simulated with relevant test cases. The following data can be simulated: delays, detours due to construction work, vehicle depletion.

The advantage is that all processes and interfaces are already present in the project (grey) and a quick and easy implementation of the simulated test cases is possible. The changes to the existing processes are shown in green, the simulated data flow of real-time data into the data hub (ADB).

Alternative approach in Liberecký kraj

KORID launched a tender for developing our own Open journey planner and Open data provider with a goal to build our own system covering the IDOL area and the neighbouring area of VON. This OJP will use all available target data (including VON data), and with the real-time data from MPV used with IDOL dispatching and real-time data from DIVA (VON).

The contract was signed 31.3.2026, and the results should be done by the end of May 2026 (test environment) and by November 2026 (fully functional).

Interaction between the systems

Open data IDOL will provide the actualised datasets in GTFS, CSV, or SHP format.:

- Target data of trains and buses (including municipal transport)
- Straight vehicles changing the lines or connection
- Connectivity (set time to wait)
- Stops and platforms
- P+R and B+R
- Geographical paths of the lines
- Real-time data will be provided via API service from

These data will be available for DIVA, the commercial OJP (Jízdní řády Seznam), and other interested subjects.

Roles of the Involved Systems

Involved systems in the VON section

The basis on the German side is the EFA server at the Upper Elbe Transport Association as part of the Saxony-wide MOOVEME app as the national multimodal journey planner providing routing services for the German network.

By using standard interfaces, the participating travel planning systems retain their respective technical roles within the project while simultaneously enabling cross-border interaction. However, future standards (NeTEx) are already taken into account, and the systems are designed accordingly.

Involved systems in the KORID section

The newly developed IDOL TIS will be used.

The service provider will run this service on their own servers.

IDOL TIS will be easily accessible via installed QR codes on the bus stop and, in the future, even in the IDOLKA ticketing application.

VON and the commercial providers (Seznam Jízdní řády) will use the available data for their TIS, which covers the whole IDOL and VON area.

System and Data Interface Interaction

In the project region of Saxony / Liberec Region, the first step will be the exchange of real-time timetable information between the two regions, which will also include further information - such as disruptions caused by construction sites or bus services in high demand (e.g. hiking groups in the tourist regions of the Zittau and Jizera Mountains).

The initially simulated data serves to test the extent to which the data query across the border functions flawlessly from a technical standpoint. Provided there are no problems and the real-time data is available on the Czech side, it can be integrated into the system – practically at the push of a button. Furthermore, efforts have already been made to integrate neighbouring regions into this system, especially the bus services in Ústecký kraj and the trains of the Polish Koleje Dolnośląskie (KD).

E. Technical Integration and Implementation

Routing Request Processing

While the tender process on the Czech side for the creation of a real-time database has been completed and work on it has now begun, the simulation solution for the Czech data has been implemented on the German side and made visible on the interfaces of the websites of ZVON (https://www.zvon.de/de/fahrplanauskunft), Dresdner Verkehrsbetriebe (https://www.dvb.de/de-de/), Verkehrsverbund Mittelsachsen (https://www.vms.de/) und Sachsenauskunft (https://www.sachsenauskunft.de/).

This allows for the display of delays, detours due to road closures, and service disruptions. The Dresden public transport website can also show vehicle occupancy levels, a feature not yet available on the other websites.

Cross-Border Data Exchange and Interoperability

Cross-border journey planning requires the exchange of routing requests and responses between systems operating in different regions. Once the Czech data is available, data exchange will take place via a GTFS interface. On the German side, the future EU-standard is implemented using NeTEx; however, further adjustments to the future standard are still required in the Czech Republic. Further development towards the OJP standard is also planned.

Improvements Introduced During the Pilot

The pilot action explores improvements in the technical interaction between journey planning systems involved in cross-border routing. Compared to the baseline situation, the pilot aims to improve the ability of the systems to exchange routing information and support cross-border journey planning for passengers travelling between the two involved regions Upper Lusatia/Lower Silesia and Liberecký kraj.

In particular, the first TRANS-BORDERS project also enabled further development of the cross-border bus lines 691 (Hrádek nad Nisou – Świeradów-Zdrój) and 692 (Zittau - Frýdlant v Čechách) initiated there, so that the two TRANS-BORDERS projects form a common framework for the further development of cross-border public transport in the project area.

F. Technical Constraints and Dependencies

There were different problems on both sides of the border. On the German side, the data was available at the start of the project, but it was located at various institutions and was not fully interconnected. On the Czech side, there was initially a dependency on a system provider who was unwilling to make this data available for the project and instead wanted to sell and expand its own software solutions across the border.

These problems were resolved, enabling real-time data exchange for the project region. However, fundamental problems persist in the border region, both between the German state of Saxony and the two other Czech border regions, Ústecký kraj and Karlovarský kraj, as well as with the Polish neighboring regions of the Dolnośląskie and Lubuskie voivodeships.

However, the TRANS-BORDERS+ project has created the conditions to build on the results achieved and to gradually introduce real-time timetable information in other regions as well.

G. Conclusion

It was explained that the technical implementation of real-time data is not fundamentally a problem but is failing due to contractual issues on the Czech side. There is no discernible willingness for cross-border cooperation on the part of the IT service provider responsible for national data management. Even the involvement of the relevant ministries could not change this.

Therefore, the alternative solution based on simulation data demonstrates that cross-border real-time data information is possible in Partner Region 2 (Saxony/Liberec Region). It remains to be seen whether the contract currently awarded in the Liberec Region for the creation of real-time data in the regional area will be successful and can be incorporated into the project.

The project participants still intend to extend the real-time data information to the other Czech border regions with Saxony and also to develop a solution towards Poland, at least in rail transport.

H. Directory of Illustrations