Ecotrainbook
Driver assistance system

DB RegioNetz Verkehrs GmbH
Manuela Kusche, Steffen Geipert
P.R-RNV
Frankfurt, 28.04.2010
Ecotrainbook is the result of the successful cooperation between DB Systel and DB RegioNetz for the optimisation of regional rail traffic.

The EcoTrainBook system solution was developed by DB Systel and DB RegioNetz Verkehrs GmbH-Erzgebirgsbahn, for use in local rail passenger traffic.

The system offers the following functions:

- **Energy efficient driving**
  based on speed recommendations for low fuel consumption

- **Transmission of timetable data and delay forecasts in real time** on the basis of the commonly recognised VDV interface (DB internal/external)

- **Improvement in operating communications**
  Direct dial via intelligent on board directory (train and location-specific numbers)

- **User-specific modules**
  Consumption data capture for diesel and water; instructions database; official reports
The benefits of the Ecotrainbook functions in overview:

- **Energy efficient driving**
  The speed recommendations in the Ecotrainbook systems have led where it has been used (DB AG - Erzgebirgsbahn, Arriva Deutschland GmbH - Vogtlandbahn) to measurable energy savings
  **Benefit: savings in diesel consumption of an average of 4%**

- **Improvements in operating communications**
  The intelligent on board directory enables easy, fast, secure communication between the driver, movements supervisor and control centre, both in normal running and when things go wrong
  **Benefit: high level of staff satisfaction and acceptance amongst users (drivers)**
The benefits of the Ecotrainbook functions in overview:

- **Transmission of timetable data and delay forecasts in real time**
  By supporting the commonly recognised VDV interface, customers and orderers can be supplied with real time information about timetables and likely delays.
  **Benefit:** Improvement of the intermodal information offer
  Orderers and customers receive real time train information

- **User-specific modules**
  Ecotrainbook is a high performance on-board computer with with a large touch display. The following additional applications are already functional:
  **Benefits:**
  - Diesel consumption data analysis e.g. for the detection of damaged engines.
  - Analysis of engine coolant consumption
  - All necessary official documents (instructions) are stored on Fassi.
The principle of energy-saving driving

The traction unit's energy consumption can be reduced by up to 8% through the following factors:

- Minimising speed changes
- Reducing the maximum running speed
- Continuous calculations to support the driver

On average, savings of ca. 4% are achieved.

Optimisation occurs by means of the calculation of a so-called Riemann integral within the limits timetable and section of line.
Basic function of the system – cab display

- Displays energy-optimal speed
- Acoustic recommendation to coast (neutral position)
- Working timetable display incl. ATC operation
- Displays speed-restricted route sections
Basic function of the system – train number selection

- Train number selection
- Pre-selection of working timetable area
- Constraint on departure time +/- 2 hrs
Basic function of the system – overview of speed-restricted sections

<table>
<thead>
<tr>
<th>Übersicht der Langsamfahrstellen</th>
<th>Anfang</th>
<th>Weiter</th>
<th>Zurück zur Anzeige</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image of table with speed-restricted sections]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Bärenstein-Grenz**: Annab-Buchh u Bf
- **Cranzah-Annab-Buchh u Bf**: Cranzbannberg u Bf. Bremsweg neu 400 m
- **Cranzah-Annab-Buchh Süd**: 15,3 - 15,4
- **Annab-Buchh Süd**: Esig 15A 15,71 neu
- **Schöfled-Wiesa-Wolkenstein**: 6,8 - 7,3 500 m 40
- **Schöfled-Wiesa-Wolkenstein**: 7,2 - 7,3 Absturzgefähr
- **Schöfled-Wiesa-Wolkenstein**: 7,8 - 7,9 Absturzgefähr
- **Schöfled-Wiesa-Wolkenstein**: 8,5 - 8,6 100 m 30
- **Wolkenstein**: 13,3 - 13,9 700 m 20
Basic function of the system – control centre main view

Overview of all active traction units on the route network

Phone calls to drivers by mouse click

Overview of delay times for every train number and subsequent trains
Conclusion

What are the major advantages compared to other commercial solutions?

- Access to detailed track data (position, gradient, speed, train path elements) via GSM/GPS improves reliability of the system
- Database stores tractive resistance for all train path elements
- Access to timetable database and actual positioning
  - Calculation of speed recommendation optimized for energy consumption and timetable (considering actual delays!)
  - 4-10 % reduction of fuel consumption
- First solution of a driver assistance system for multiple units and locos deployed in regional transport
- Exchange of timetable data and delay forecasts on the basis of the commonly recognized VDV interface (DB internal/external)
  - Automatic information of the local train/bus operators of terminal arrival times to harmonize connections
  - Increase of the passenger comfort