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New concepts for regional railways

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DLR develops new concepts for regional railway lines

Regional railway lines are often threatened with closure because they cannot be operated in an economically viable way. The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) now presents new concepts that can make regional railway lines economically attractive again. Positioning systems on locomotives, optical systems at railway crossings and new management processes for regional railway lines can all contribute to this goal.

On 8 October 2008, DLR organised a workshop in Braunschweig on the efficient use of regional railway lines, to mark the completion of an important railway research project. Through the project "New Operational Concepts for Regional Railway Lines", DLR scientists are contributing to making railway transport a more attractive mode of transport for destinations not on the main lines as well. The project was commissioned by the Ministry for Economics, Labour and Transport of the German federal state of Lower Saxony. Regional railway lines often cannot be operated in an economically viable way due to the costs of servicing, maintenance and staffing. For this reason, political authorities, regulatory agencies, transport companies, industry and research institutions are all looking for solutions to make railway transport a more attractive option for regional links as well. The aim is to enable punctual, reliable, safe and economical transportation of passengers and cargo by railway. During the workshop, new ideas were presented and problems and solutions were discussed.



RailDrIVE test vehicle puts positioning systems to the test

POSITRON: Using modern positioning technology to save costs

One way in which the economic viability of regional lines can be improved is by reducing trackside infrastructure, for instance by moving positioning technology to the traction vehicle itself. The positioning system is used to determine the position of trains. This is important for safety, and it is also a precondition for ensuring connections and providing accurate passenger information. Up to now, so-called train detection systems (such as axle counters) were installed along the line. Servicing and maintaining these systems is costly, however, and they are inflexible, making it difficult to implement operational changes. For this reason, DLR scientists are developing the POSITRON system (Positioning for Safe Train Operation and Navigation), which ensures reliable and accurate positioning using GPS (Global Positioning System), a digital map, and at least one additional sensor.

Increasing line capacity by improving safety at level crossings



Radar sensor for positioning mounted on RailDrIVE

Railway lines carrying trains travelling at speeds of up to 160 kilometres per hour can be crossed by roads at level crossings. On main lines, level crossings mostly have extensive automatic safety installations. On secondary lines, however, the so-called St Andrew's Cross is often the only safety feature at level crossings. Trains using such lines can therefore only travel at significantly lower speeds on certain sections. This calls for solutions which help prevent accidents and allow line capacity to be

increased. In addition to this, there are also level crossings which are permanently closed. Drivers and pedestrians can use a telephone to ask for the barriers to be opened - these are so-called "Anrufschranken" (normally closed barriers with telephone). Such systems have not been automated yet, however, and therefore involve personnel costs. For this reason, DLR is investigating other options using more cost-efficient technologies. Optical systems could for instance monitor the danger zone - the area between the barriers - using cameras. By comparing the recorded images, they could give the "all clear" signal. This technology would enable these crossings to be automated.

In the first phase of the "New Operational Concepts for Regional Railway Lines" project, DLR has analysed the challenges and problems posed by the current infrastructural situation of the regional railway network. Based on this analysis, new solutions are developed for control and signalling technology, positioning technology for railway vehicles, operational procedures, assessment of life cycle costs and verification of safety requirements. Some of the project results were presented at the workshop.

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