

# Axis network cameras protect passengers in Deutsche Bahn intercity trains.

Situation on German railroads monitored with surveillance system.



**Organization:**  
Škoda Transportation a.s.

**Location:**  
Germany

**Industry segment:**  
Transportation

**Application:**  
Public transportation  
safety and security

**Axis partner:**  
Indanet GmbH

## Mission

During construction of intercity train cars for Deutsche Bahn, Škoda Transportation had a request for equipping passenger interiors with a recording surveillance system, to comply with standards for railway equipment and to fulfil requirements for use of video in security applications in public transportation.

## Solution

Deployment of cameras in the train interiors was handled by a German system integrator, Indanet GmbH. The system uses its own software solution for camera control nxDataHub, which interconnects nxVide recording devices with other systems in a common network. NxDataHub collects information from all devices in the system, analyzes it and makes it available for train set diagnostics.

## Result

Deutsche Bahn trains fulfill the requirement for video recording from IP cameras on the Nuremberg-Ingolstadt-Munich line. Every car is equipped with an independent recording device. Each train set is equipped with 72 cameras, while there are a total of 6 train sets. AXIS P3904-R Network Cameras were used solely for integration, which only differ in the various lenses by 3.6mm and 2.8mm. The cameras actively use a camera covering detection feature, but no further image data analyses are performed.

**“An important reason to use IP cameras was the high image resolution that the cameras offer. Another reason was the reduction in cabling thanks to use of power and data transmission over a single cable (PoE).”**

Jürgen Fuchs, Indanet.

### Digital camera chains must fulfil demanding criteria in the field of passenger transportation

Deutsche Bahn had laid an exacting requirement for a fully digital camera system with a rather high number of cameras in a car. There are 72 of them in each train set. The whole system must be immune to a high level of electromagnetic disturbance, which is typical for railway vehicles. This is linked with specific cabling requirements, exactness of implementation, etc.

“Perhaps the greatest challenge for us was segmentation of compartments and associated complications of monitoring with a surveillance system. Each country and each operator have their specifics and needs, i.e. also the Federal Republic of Germany and Deutsche Bahn,” says David Hlavsa, designer of Škoda Transportation a.s., which delivers the trains for Deutsche Bahn. These include e.g., VDV standards, the necessity of using proven suppliers, privacy policy legislation and general legislation requirements or demonstrativeness of correct system functions under all sorts of conditions. Axis cameras fulfill all of these demanding requirements. The surveillance system is basically autonomous, except for sending diagnostic data for the vehicle control system, so-called TCMS (Train Control and Management System).

### Škoda trains use IP cameras for increasing safety of operation

The task of Axis cameras in Deutsche Bahn trains is to capture potential hazardous moments. They capture the entire area inside the train. The camera image and its analytics are processed in software by the onboard computer's internal system, so that there are no additional solutions necessary, such as ACAP, specific for Axis cameras.

Indanet had deployed its own nxDataHub software for Deutsche Bahn, which interconnects video recording devices in a common network and provides data exchange of the surveillance system with surrounding systems.

From the analytic camera functions, detection tools for recognizing covered camera lenses, out-of-focus camera previews, etc., are used. The nxVideo recording system, developed by Indanet, is deployed in the whole project. NxVideo is software that is specially adjusted for the needs of public transportation, with all its specific requirements.

### Cameras accelerate further development of safe transportation

Great developments can be expected within Europe especially with regard to surveillance systems in transportation, which are ceasing to be just a preventive measure against vandals. Possibilities for counting passengers or their movement in the cars are being tested, which then helps engineers in designing car layout. Already established models are coming from the car industry. In the near future there are plans to use external thermal cameras for capturing the track, since a camera may capture movement of an individual on the track at up to three times greater distance than a human eye. Nowadays it is possible to limit train speeds in hazardous sections via software, thereby preventing accidents or damage to the tracks.

