# Modernisation and Expansion of AVLC System
## Kölner Verkehrs-Betriebe AG, Germany

**Industry**
Bus, Light Rail

**Objective**
Modernise and Expand
AVLC System

**Solution**
Trapeze Intelligent
Transport System

## Overview

**366 buses**

**381 trams**

**56 bus routes**

**11 tram routes**

**275 million passengers annually**

## Results

✓ Upgrade to digital radio system

✓ Expanded Automatic Vehicle Location and Control (AVLC)

✓ Passenger information



**Kölner Verkehrs-Betriebe AG commissioned Trapeze to expand and upgrade their operations control system.**

### Background

Kölner Verkehrs-Betriebe AG (KVB) employs around 3,400 people and carries 275 million passengers a year. With around 750 vehicles, KVB services a total of over 2,000 stops on 11 light rail vehicle routes with a route length of 238.7 kilometres as well as 56 bus routes with a route length of 562 kilometres.

### The Solution

In 2009, KVB commissioned Trapeze with the expansion of its operations control system. In 2012, the control centre and the digital radio system were upgraded to current releases.

All KVB servers and workstations are implemented as virtual machines. There is a redundant control centre which is equipped for parallel operation. Data management in LIO-Data is used by KVB together with Stadtwerke Bonn. The two companies jointly operate tram routes 16 and 18.

In addition to real-time information, there are also powerful statistics functions available. If necessary, data is automatically forwarded through standard interfaces.

**The functionalities:**

• Automatic vehicle location and control system LIO

• TETRA radio system (Airbus)

• On-board computer generation IBISplus G1

• GPS-based location

• Transfer protection

• Passenger information (third-party DPI signs)

• Data supply with LIO-Data, data transfer from Microbus

• Traffic light pre-emption

• Extensive statistical data available in Business Intelligence and ISAS2

• Data exchange with ActiveForms+ for processing of information in the third-party system

• Completely virtualised HW platform

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## The system at a glance

**Control centre**
29 dispatcher workstations, 25 info stations, 10 data supply and/or statistics workstations

**Radio system**
Tetra digital radio: 17 base stations, 34 repeaters

Radio devices in vehicles plus 520 hand-held devices

**Vehicles**
366 buses in total (235 own buses, plus 131 fully integrated buses from third-party companies)

381 light rail vehicles

**Dynamic passenger information**
150 third-party DPI signs

**Depots**
5 in total, equipped with Wi-Fi (50 access points)

**Third-party components**
Passenger information, planning program, ticket vending machines, VoIP/TETRA voice system, incident management

**Software interfaces**
VDV452 planning program, VDV454 multi-agency, incident management, VDV453 data distributor

## Results

• Upgraded digital radio system

• Expanded Automatic Vehicle Location and Control (AVLC) system

• Passenger information

*"The AVLC is the most important dispatching instrument for our vehicles. Passenger information at the stops is guaranteed at all times thanks to the large number of DPI signs – especially when it comes to light rail vehicles. In the vehicles, passengers are promptly informed of special situations acoustically."*

Dirk Scholz, RBL Project Manager, Kölner Verkehrs-Betriebe AG

### TRAPEZE GROUP

Trapeze Group works with public transport agencies and their communities to develop and deliver smarter, more effective public transport solutions. For more than 25 years we have been Here for the Journey, evolving with our customers around the world to helping them move people from point A to Z, and everywhere in between.

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