



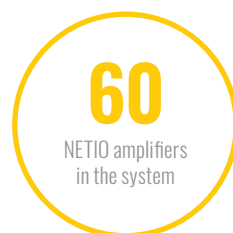
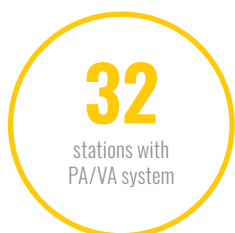
PA/VA

# Bogestra

## Introduction

Bogestra is a provider of public transport services in the **eastern part of the Ruhr region**. The operator manages over 12 train lines and is constantly expanding its infrastructure. In 2019, the operator carried over 140 million passengers.

In 2018, Bogestra began the reconstruction of **32 underground stations** where one of the key elements was a digital PA/VA system for the individual stations. The upgraded line **connects the cities of Herne – Bochum – Gersenkirchen** over a distance of about 20 km. The upgraded stations were divided into 2 types, being smaller local stations and larger interchange hubs.



## Challenge

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Key technical requirements of the project included:



**Automated Message Generation** on fully redundant hardware



**TCP/IP transmission** from OCC to stations on customer LAN



**Monitoring of all PA health** and status from the OCC

- » Integration of the PA system with the passenger announcement server
- » Integration of the PA system with dispatcher's workstations
- » Confirmation of the announcement being broadcast on the platforms to the OCC
- » Compact equipment housing with the option of mounting in available rack cabinets



## Solution

For the Bogestra project, Ambient System worked together with the customer and system integrator to develop a solution using the Ambient NETIO. Overall, the system now consists of around **60 NETIO amplifiers and 30 emergency microphone stations (ABT-DFMS)**.

The Ambient NETIO is an IP-enabled 4 channel device with full audio DSP and 100 V Class D power amplifiers. NETIO can receive multi-channel audio from LAN/WAN or locally through analog audio inputs. System networking is based on TCP/IP and the network card contains both copper and fibre ports with options for full redundancy.

**The NETIO amplifiers are advanced, energy efficient Class-D 100 V design**, and the DSP capabilities include input and output EQ, audio compressor/limiters, a feedback eliminator and a delay line with a 30 second capacity.

A key requirement was to provide audio-over-IP communication, detailed system control and integrated fault reporting between 32 stations and the regional OCC in Bochum. Ambient System developed an extended interface to link the operator's Text to Speech engine to the NETIO hardware working alongside the live voice announcements from microphones. Live voice messages can be directly streamed from the OCC or they can be stored locally in the station's NETIO device and then triggered from there.

Ambient System has developed many specific features for transport applications in use on the Bogestra project. A particular requirement was to record all communications from the fire microphone including routing and time stamp information. Call stacking was also required so that any voice message routed to a busy PA zone is held within the Ambient NETIO and broadcast once the preceding announcement is complete.

**The complete system is designed to EN 54-16** for voice evacuation. Therefore, each station has ABT-DFMS microphones with integral network cards offering both SFP and RJ45 for redundant connection with the OCC.

The project was successfully completed on time and in budget and now the passengers between Herne and Gersenkirchen have clear, intelligible passenger information messages combined with the safety of an Ambient EN 54-16 voice evacuation system.

