# AAEON NVR systems keep your rail router applications on track

*Industry: Transportation*
*Product: VPC-3305S-A*

## Introduction

Trains have been transporting people across countries and continents for hundreds of years, and with the development of high-speed locomotives, maglev systems, and Hyperloop technology, it seems certain that trains will be running well in to the next century and beyond. The central feature of recent developments in train technology may be speed, but modern travelers are not content with simply getting to their destinations as quickly as possible. They also demand information about their journeys, entertainment, comfort, and security systems. To fulfill these requirements, train operators have to build integrated, in-vehicle systems around powerful embedded PCs.
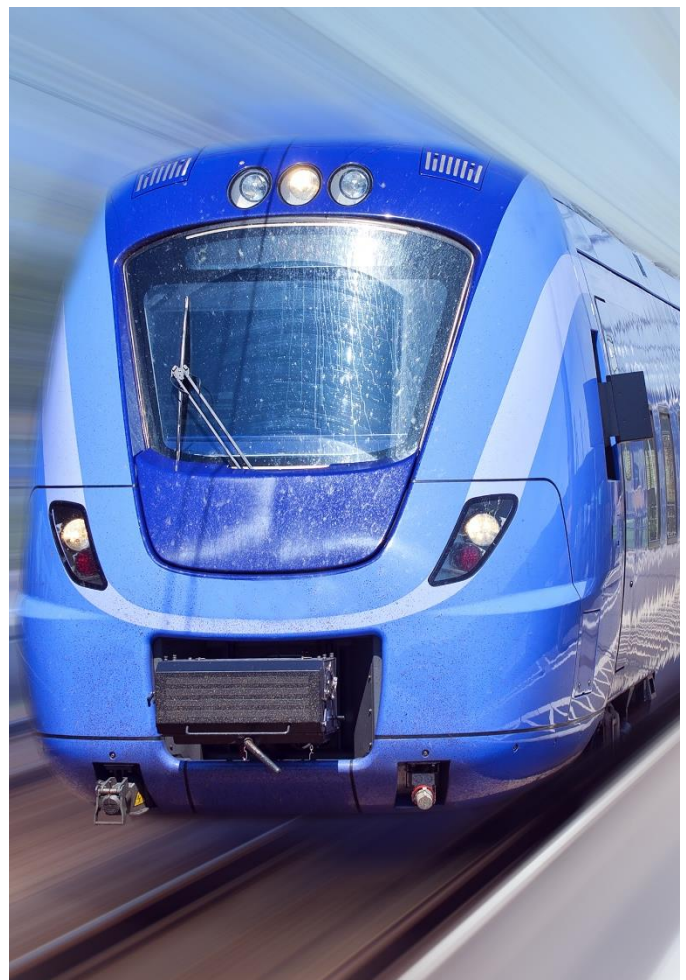
## Customer challenges

In the wake of the 9/11 terrorist attack, the issue of security took on a new importance in America, and concerns have grown with subsequent attacks and the ongoing problem of gun violence. As a result, air and rail travelers have demanded more visible and effective security systems.

To meet this demand, the end user – a US rail service provider – wanted to install security cameras in its train carriages. Additionally, they wanted the system they adopted to manage onboard digital signage, and provide passengers with WiFi. The computer used in the system would therefore have to be versatile, rugged, and extremely reliable.

### System faults

A major problem with previous systems was that when a single security camera stopped working, the entire system would shut down. This was a common issue, and it meant that either trains were left without a security presence or that the service provider would have to continuously devote time and labor resources to routine maintenance checks.

## Environmental sensors

To ensure the comfort and health of passengers, the end user also wanted to install temperature and air quality sensors in carriages. As part of its solution, it wanted to be able to respond to rising or falling temperatures and also indications of poor air quality by remotely adjusting trains' heating, air conditioning, and ventilation controls.

## Harsh conditions

In-vehicle systems have to cope with almost constant vibrations and the jolts that come with sudden acceleration and deceleration. Another issue is their reliance on unstable DC power supplies with voltages that might surge or suddenly drop. Finally, with trains running across the country throughout the year, they experience severe extremes of temperature.

Each of these problems would be enough to derail standard computing systems, and when taken together, they present a major obstacle to the success of the project.

## AAEON's solution

As one of the world's leading developers of industrial computers, AAEON was able to call upon a wealth of experience and expertise when working on a solution for the rail service operator. Engineers at the company devised a solution that involved fitting each train carriage with a custom model VPC-3305S-A NVR.

Each device would be connected to a security camera, environmental sensors, and a digital signage monitor. At the front and rear of the train, a rackmount central computer would send data to the NVRs.

The VPC-3305S-A, with its six smart PoE ports, expansion capabilities, and Intel Atom Processor E3845 CPU with its inbuilt graphics specifications, is the ideal device to provide the backbone of the rail router solution.

## Smart PoE

Smart PoE enables the deployment of cameras and sensors without the need for additional power sources, and more importantly, it gives operators a greater level of control over these peripherals.

Using a graphic user interface, operators can easily reset and reboot malfunctioning cameras and sensors. If these devices still fail to work properly, they can be remotely switched off. Crucially for end users who need their systems to run continuously, all of these operations can be performed without the rest of the network being affected.

## Passenger services

With the HD graphics package on the VPC-3305S-A's Intel CPU, the NVR is able to control in-carriage monitors, delivering journey information, adverts, promotional videos, and any other content the train service operator wants to broadcast.

Dual WiFi antennas give passengers safe access to the Internet on their computers and smartphones.

Passenger comfort is also addressed through DIO circuits that respond to in-carriage conditions by adjusting heating, air conditioning, or ventilation systems.

## Rugged system

The VPC-3305S-A has undergone military-grade MIL-STD-810G testing for vibration resistance and can withstand the constant buffeting it will receive during long-distance train journeys. As it's a fanless system, it's far more reliable for rugged applications such as this. Through a combination of intelligent thermal component design, heat spreaders, and high-grade, insulated components, it still boasts an operating temperature range of -20ºC to 70ºC, meaning it's well-equipped to handle America's harsh winters and blazing summers.

## Impact

By implementing the VPC-3305S-A-based AAEON solution, the rail service operator increased the comfort of passengers, gave them the journey information they needed, and supplied them with a strong WiFi signal.

Most importantly, it was able to make its security system more reliable and cost effective. Staff can now quickly respond to security threats or aggressive behavior, and thanks to the system's smart PoE functionality, the company can simply reboot faulty cameras instead of sending out maintenance crews to physically check on hardware.

Faster, more profitable service with higher levels of customer satisfaction – why not find out what AAEON can do for your business?

## ABOUT AAEON

Established in 1992, AAEON has become one of the leading designers and manufacturers of advanced industrial and embedded computing platforms. Committed to innovative engineering, AAEON provides Industry 4.0 integrated solutions, hardware and intelligent automated services for premier OEM/ODMs and system integrators worldwide, as well as IoT solution platforms that seamlessly consolidate virtual and physical networks. Reliable and high quality computing platforms include industrial motherboards and systems, industrial displays, rugged tablets, PC/104, PICMG and COM modules, embedded SBCs, embedded controllers, network appliances and related accessories. AAEON also offers customized end-to-end services from initial product conceptualization and product development through to volume manufacturing and after-sales service programs. It is also committed to continuously redefining and harmonizing the management and development processes of the industry.

With a constant pursuit of innovation and excellence, AAEON became a member of the ASUS group in 2011, further strengthening its leadership fueled by advanced technology from ASUS and leveraging resources within the group. AAEON is poised to offer more diversified embedded products and solutions at higher quality standards to meet world-class design and manufacturing demands in the years to come.

AAEON is an Associate member of the Intel® Internet of Things Solutions Alliance.

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