AAEON Advances Airport Accessibility with AMR
BOXER-8645AI

With high foot traffic over a large area that can span multiple terminals, airports do not simply act as transportation hubs, but can be seen as miniature cities. Given the popularity of air travel and the role that it plays in today's global ecosystem, airports have embraced the opportunities that come with making travel not only more accessible, but more comfortable.

With sprawling areas dedicated to shopping, restaurants, leisure lounges, and even accommodation, the passenger experience as a whole has greatly improved. With these developments however, come other considerations. Airports are enormous facilities, and this intrinsically presents a particular set of challenges to passengers with mobility issues. To combat this, a systems integrator contacted AAEON in search of a product suitable for their autonomous passenger transport vehicle, finding the BOXER-8645AI to be the perfect fit.

Navigating Accessibility

The client wanted their autonomous passenger transport vehicle to be able to safely transport passengers through a busy, high-traffic environment without human intervention, so obstacle avoidance was a crucial prerequisite to the solution's central unit.

As such, they required a product capable of processing both visual and sensor data simultaneously with minimal latency, while also being durable enough to withstand dynamic, real-world use.

How AAEON's BOXER-8645AI Drove the Project's Success

Key reasons for the client choosing the BOXER-8645AI to power their autonomous passenger transport vehicle was its unique combination of GMSL2 camera support, its ability to run extremely detailed AI inference models, and its rugged mechanical design.

GMSL2 Camera Support for Real-time Vision

Equipped with eight FAKRA connectors for GMSL2 camera integration, the BOXER-8645AI could provide the real-time transmission of high-resolution image data, with the additional advantage of data rates of up to 6 Gbps. As a result, image data could be transmitted with far less latency than cameras installed via other interfaces, making it ideal for the application.

The autonomous passenger transport vehicle benefitted from the fact that the BOXER-8645AI could host multiple GMSL2 cameras, allowing it to maintain a comprehensive field of vision. This allowed the vehicle to navigate crowded areas, avoid obstacles, and transport passengers safely across various areas of the airport while accounting for all objects within its vicinity.

Enhancing AI Precision: GNSS & Time/Frame Sync

For collision avoidance, the BOXER-8645AI's serial communication interfaces were paramount, with the system hosting four DB-9 ports offering isolated CANBus, an 8-bit digital I/O, and two RS-232/422/485 signals.

The customer utilized the device's CANBus interface to implement control over the vehicle's motors and actuators, while its RS-232 option was programmed to receive data from proximity sensors and execute real-time responses such as relaying event triggers to the BOXER-8645AI.

The system's RS-485 was also used in conjunction with its LAN ports to connect multiple LiDAR sensors, boosting the obstacle detection and avoidance capabilities of the vehicle.

For navigation, the BOXER-8645AI's GNSS support was crucial, allowing for precise positioning within the airport with time and frame synchronization to align sensor and camera data in real time. In addition to this, 9-Axis sensor support enabled SLAM functionality, generating orientation data to go along with the application's LIDAR and visual data.
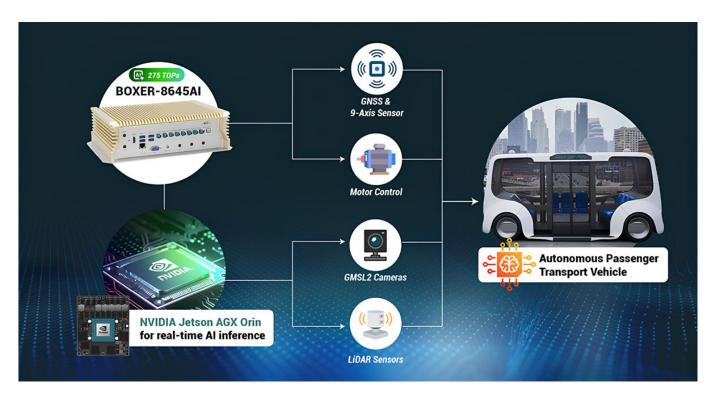
First Class AI Inferencing

By choosing AAEON's BOXER-8645AI, the client also leveraged exceptional AI inferencing, given the PC's NVIDIA® Jetson AGX Orin™ platform. Relying on the 2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores and up to 275 TOPs of AI performance, the BOXER-8645AI provided the vehicle with the tools needed to detect and recognize its surroundings without the need for exclusive path-planning.

Thanks to its NVIDIA JetPack™ SDK support, the BOXER-8645AI offered a wealth of preinstalled development components, including the NVIDIA® CUDA® Toolkit, Deep Neural Network library (cuDNN), and the NVIDIA® TensorRT™ API ecosystem. Alongside this was AAEON's own OS, tailored for AMR use. Among AAEON's offerings were a DIO setting command and sensor registers for IMU sensor integration.

Military-Grade Hardware

The client found that the mechanical design of the BOXER-8645AI was more than capable of dealing with the environmental challenges that their application would encounter. Designed to tolerate deployment in settings such vehicles and rolling stock, the BOXER-8645AI boasts MIL-STD-810G standard tolerance to both vibration and shock, ensuring it remained operational within such a dynamic setting.

Application Architecture

Project Impact

The BOXER-8645AI was integrated into an ergonomically designed unit capable of seating two passengers at a time. As a result of this addition to the airport's offerings, passengers with mobility issues and those requiring extra assistance now have peace of mind when travelling to their departure gates. Moreover, the application has increased customer satisfaction, given the vehicle's contribution to providing a comfortable way to access all airport facilities, regardless of individual circumstances. Finally, the contribution of the BOXER-8645AI can be best illustrated with how it helped the application adhere to strict safety standards, enhancing the travel experience for all.

About AAEON

Established in 1992, AAEON is one of the leading designers and manufacturers of industrial IoT and AI Edge solutions. With continual innovation as a core value, AAEON provides reliable, high-quality computing platforms including industrial motherboards and systems, rugged tablets, embedded AI Edge systems, uCPE network appliances, and LoRaWAN/WWAN solutions. AAEON also provides industry-leading experience and knowledge to provide OEM/ODM services worldwide. AAEON works closely with premier chip designers to deliver stable, reliable platforms. For an introduction to AAEON's expansive line of products and services, visit www.aaeon.com.