



Smart Railway Computer Solutions

Telematics for Transportation Security and Efficiency, Plus Passenger Satisfaction

This evolution drives the need of embedded computer in having high performance, longevity and reliability, fitting perfectly with railway environments. NEXCOM offers train PC featuring AI-pow-

ered, 5G NR, Wi-Fi 6E wireless connectivity, anti-shock design, metal dust proof ability, stable & wide range power supply, industrial-grade reliability and extended product life cycle.

nROK Series

- Railway Computers – EN50155
- Intel Atom®/8th/9th Gen Core™/Xeon® CPU
- Fanless and rugged design
- 5G/LTE, Wi-Fi, BT, CAN, GPS + DR, PoE, and multi-SIM integration
- Optional isolated 24~110VDC power input
- AI applications with add-on GPU cards
- EN50155 & EN45545-2 certifications



VTC 1911-IPK



nROK 1020



nROK 6222



nROK 7252



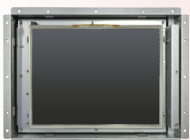
nROK 6221



nROK 7251

vROK Series

- 10.4-inch all in one railway open frame panel computer – EN50155



vROK 3030

aROK Series

- Advanced AI Computers with GPU – EN50155
- Intel® 8th/9th Gen Core™/Xeon® CPU
- Designed for AI applications: driver assistance, track obstacle/intrusion detection, track maintenance, video analytics
- Selected NVIDIA GPU, Google TPU, and Hailo AI modules add-ons
- 5G/LTE, Wi-Fi, BT, CAN, GPS + DR, PoE, and multi-SIM integration
- EN50155 & EN45545-2 certifications



TAIWAN EXCELLENCE 2022



aROK 5510



aROK 8110

NEXCOM

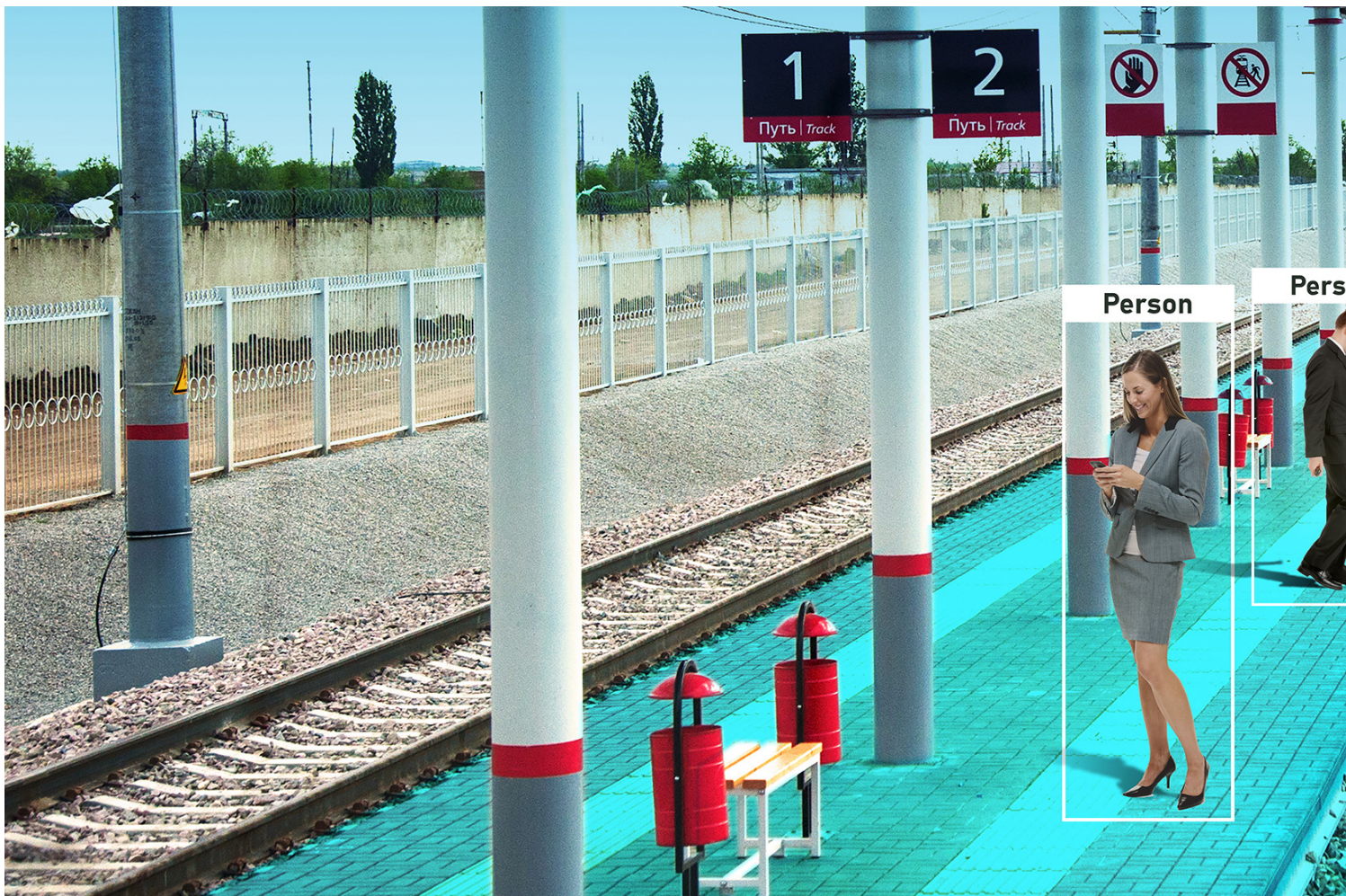
AI Computing and Intelligent Surveillance – NEXCOM’s Key to Railway Revolution

The swift and relentless advances in computing, including artificial intelligence (AI) and advanced video data analytics, have already been delivering benefits to many businesses and society.

The rail industry is no exception in wishing to exploit these advances. However, railway operators are

constantly struggling to meet their passengers high expectations and challenges are

present for such technology to be implemented on to the railway system.



The Demand

On-train computing solutions are required for a broad range of application areas, including: train security, safety & operational management, train telematics & asset monitoring, passenger infotainment, driver advisory support, and train communication infrastructure.

These applications encompass video recording and analytics solutions for passenger/luggage security, seat occupancy, COVID-19 mask wearing compliance, people counting, door clearance, and the adoption of AI-based analytics for scene analysis and facial recognition. In addition, there are train forward-facing applications consisting of: video

& LIDAR analytics for monitoring signal light adherence, detecting track obstructions, flooding alert, vegetation ingress assessments, and rail-side/bridge damage detection. To further ensure everyone's safety, there is also an option in providing platform approach surveillance – alerting any platform incidents prior to the train arriving at the platform on to the display of the train's cabin.

High-performance mobile access hubs would be providing wifi access and multiple 5G/LTE communication channels to the internet while on the move. It will support high-throughput on-train networks, including up to 10GbE LAN port with multiple PoE connections to PoE cameras, PoE displays, and intelligent antenna or sensors.

The On-Train Challenge

The computing platforms supporting such on-train applications are required to meet the strict criteria of EMC, operating temperature ranges, shock, vibration, and power input performance that the rail industry has defined for any electronic equipment installed on rolling stock. Moreover, equipment manufacturers are required to obtain several rail standards, including EN50155, EN45545-2, and many others.

To complicate things further, supply voltages of 24, 48, 72, 96 and 110VDC are used on rolling stock. In spite of any power interruptions of up to 10ms, output of the system's power



supply should be continuously delivered.

Other challenges include physical constraints, with limited cabinet space, meaning the size of the computing equipment is heavily restricted. Thus, the installation needs to be carefully planned as operating temperature may be affected by tight shared enclosures among other electrical equipment.

Edge computing is significant when it comes to efficient data communication rates. For instance, instead of embracing a cloud-based service, data could be processed and stored more efficiently through the collaboration of AI and camera, where data storage and analytics are carried out locally on the train.

These platforms are usually expected to run unattended and may often need remote system management support. Thus, for safety and reliability measures, operators will prefer fanless systems with IP ratings.

The Solutions

NEXCOM is a global leader in the design and manufacture of mobile computing platforms in Taiwan. The company is known to have a long and strong track record for manufacturing a wide range of high-quality systems, fulfilling requirements for most of the above applications while maintaining strict compliance with rolling stock regulations and standards. System range is continually being extended to keep abreast of the latest technical advances in computer technology, bringing benefits for on-train applications. Examples include the compact entry level nROK 1020-A and VTC

1910-IPK systems paired with low power consumption, Intel Atom® CPUs, for general purpose use. In addition, there is the nROK 622x series with Intel Atom® x7-E3950, providing configuration flexibility for cost-effective video surveillance, analytics, storage, and communications solutions.

Whereas, the nROK 7251 / nROK 7252 series is based on the powerful Intel 9th generation and Xeon® CPUs. It has up to 64GB RAM and up to four user-accessible storage bays for large data storage requirements. Moreover, there are eight PoE ports, 5G ready, and BOM optional to support up to four LTE/5G modules with eight SIM cards, maximising connectivity and throughput. Additional options for AI accelerator modules are also available. The nROK 725x series supports a full range of power input standards from 24VDC through 110VDC PSUs.

Finally, the latest vROK 3030 10.4-inch all-in-one railway open frame panel computer, is designed for human machine interface (HMI) and passenger information system applications. It implements the latest Intel Atom® x6414RE processor for both Windows and Linux platforms, with the ability to support analogue camera x 4 or PoE camera x 2 (optional) for security purposes. Its LCD panel offering 1,200nits guarantees sunlight readability, while its open frame design offers convenient mounting flexibility. Both nROK and vROK systems have -30°C to +70°C (OT3) operating temperature ranges.

AI at the Railway Edge

The NEXCOM AI edge accelerator aROK range is specifically for rail artificial intelligence applications,

employing artificial neural networks, machine vision, and machine learning. Delivering “Inference At The Edge” is NEXCOM’s goal to help developers in dealing with mass computational-intensive processes efficiently and accurately, and avoiding the need to do it centrally in the cloud. The 19” rack-mountable aROK 5510 supports 100 watts NVIDIA AI GPUs, coupled with Intel 9th generation and Xeon® CPUs; it can provide up to 128GB RAM. It also supports a high-speed NVMe drive plus six externally accessible drive bays, offering up to 24TB of on-train storage. Moreover, there are four optional PoE ports or dual 10GbE LAN along with multiple expansion ports connecting up to four LTE/5G modems and WLAN modems.

Although having the same CPU performance as aROK 5510, the aROK 8810 offers up to 450 watts of GPU power gaining the ability to support three PCIe x4 slots. Optional PCIe modules are available with two NVMe drive slots and four channel PoE ports, giving a total of 12 PoE ports.

With rich experience, wide options of reliable computing products, and recognised configuration/customisation service, NEXCOM will always be the ideal partner for any on-train computing project. Delivering safety, convenience and efficient operational management will continue to be NEXCOM’s top priority as it relentlessly strives to revolutionise the rail industry; reaching towards the promising future of AI.

