



Case Study

Public Safety Solutions for Oil & Gas Complex

Lowering the high risk for the oil & gas industry through artificial intelligence

Workers in the oil and gas industries may be exposed to hazardous environments; the flammable, corrosive substances and gas leaks could cause fire, explosion, poisoning, and hypoxia. Nonetheless, most oil and gas facilities operate around the clock and leave little time for checkups repeatedly. To ensure the safety of workers efficiently, artificial intelligence is used for assistance.

Challenges

The customer, GT SPACE, is a software and solution provider. It was looking for a partner to provide one-stop service of Xilinx FPGA and ODM services. The customer also needs the partner to provide a high-performance embedded platform to run multi-algorithms simultaneously to ensure security and public safety in the application field site. The solutions must abide by the regularities of the National Institute for Occupational Safety and Health (NIOSH).

Main Requirements

- High-performance computing platform to run multi-algorithms simultaneously
- Low latency for real-time monitoring and alarm
- 5G connection to support Remote Client Management System
- Wide operating temperature range

About GT SPACE

GT SPACE is a leading technology company specializing in Image Processing, Vision AI, and FPGA design. Combining the above three main techniques, GT SPACE provides more stable industrial-level software and hardware system solutions to customers.

[Visit the website](#)

The compact edge system runs multiple AI algorithms simultaneously

Axiomtek has proposed the RSC201, a compact and fanless edge AI system based on the Xilinx Kria K26 SoM that can run multiple algorithms at the same time thanks to its better memory efficiency. The RSC201 has a wide operating temperature range from -30°C to +75°C with an industrial-grade chip in the SoM. It features onboard 4GB DDR4 memory and 16GB eMMC. It also has a voltage input ranging from 12 to 24V. With rich expansion interfaces, it supports one M.2 Key B slot and one SIM

socket for a 5G connection and has an M.2 Key B slot for SSD storage. Also, it provides one GbE LAN port, one DisplayPort 1.4, two USB 3.0 ports, one COM port, and one CANbus.



Application

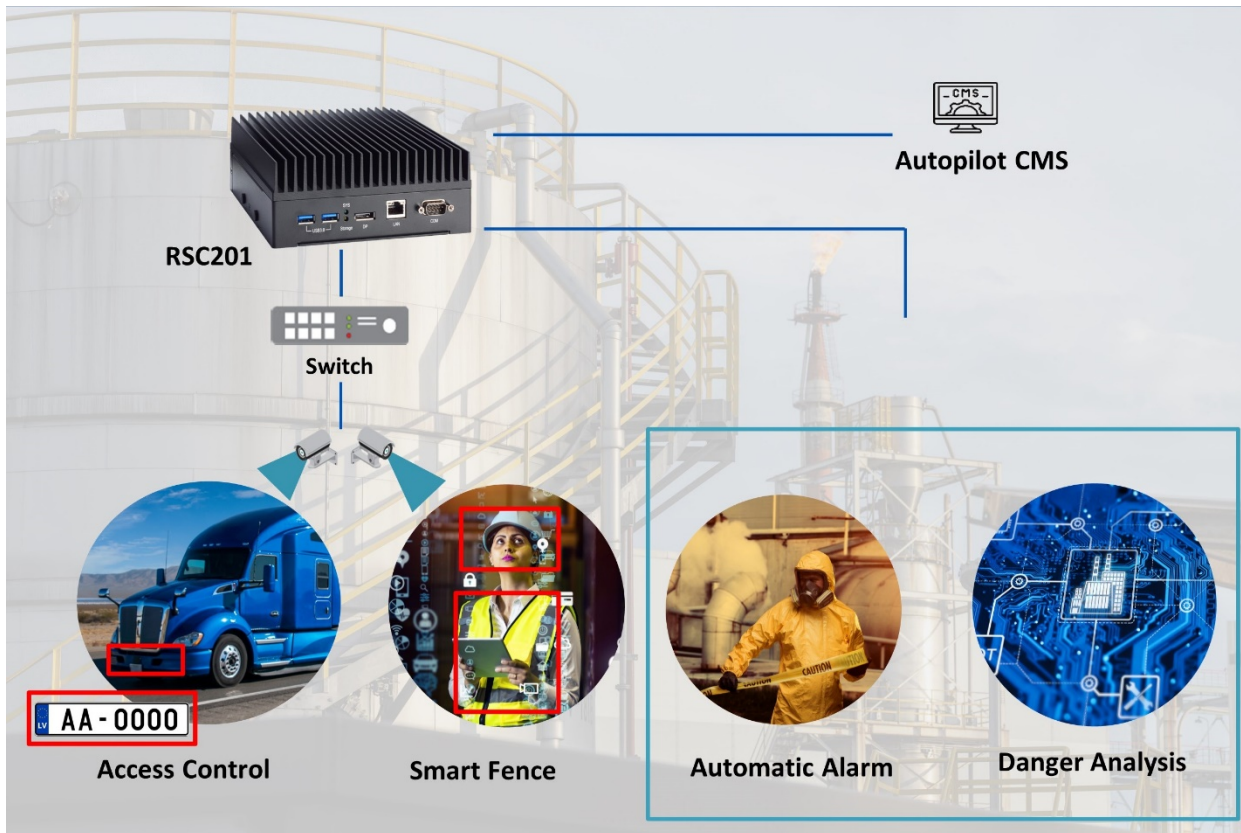
Edge AI computing protects the workers and facilities

The embedded system is deployed at the field site to run four AI models, which are number plate recognition and access control to the complex, smart fence in the restricted zone, danger analysis, and anomaly prevention.

By lowering the bandwidth of secondary memory and designing combinational logic of FPGA, the system stability can be improved to provide more reliable integrated solutions. In the year of deployment, the fire accident was zero and the number of pipeline leak has been tremendously lowered from the five-year average of 117 accidents per year to 23.

With multiple IP cameras, the rugged system can monitor the cars and personnel's arrival and departure to the complex; it prevents unauthorized vehicles from entering the complex. Besides, it does not only monitor whether anyone enters the restricted area but also with the appropriate gear to meet the safety standards. If an accident such as a gas leak happens, anyone enters the restricted area without required safety gear, or unauthorized cars breach the access control, the system would set off the alarm in consideration of safety.

More than that, the edge computing system can collect data for further analysis to optimize the AI model via machine learning, and then prevents similar public safety accidents from happening in the future.



System Configurations of the RSC201

- Based on Xilinx® Kria™ K26 SoM
- Supports GbE LAN cameras
- M.2 Key B for 5G wireless connection
- Wide operating temperature from -30°C to +75°C
- Wide voltage input from 12 to 24 VDC
- Supports Linux

*For detailed specifications, please visit www.axiomtek.com or go to Products > Systems & Platforms > Machine Vision for >[Edge AI System](#) for [RSC201](#)

Why Axiomtek

Axiomtek's IPC products offer a wide range of customization options, allowing customers to create tailored solutions that meet their unique requirements. Also, Axiomtek has a strong commitment to customer service, providing extensive pre-sales and post-sales support, as well as comprehensive product warranties. It has a proven track record of providing reliable and high-quality industrial PC (IPC) solutions that meet the demanding needs of various industries.

About Axiomtek Co., Ltd.

Axiomtek has experienced extraordinary growth in the past 30 years because of our people, our years of learning which resulted in our tremendous industry experience, and our desire to deliver well-rounded, easy-to-integrate solutions to our customers. These factors have influenced us to invest in a growing team of engineers including software, hardware, firmware, and application engineers. For the next few decades, our success will be determined by our ability to lead with unique technologies for AIoT and serve our key markets with innovatively-designed solution packages of hardware and software – coupled with unmatched engineering and value-added services that will help lessen the challenges faced by our systems integrator, OEM and ODM customers and prospects alike. We will continue to enlist more technology partners and increase collaborations with our growing ecosystem who are leaders in their fields. With such alliances, we will create synergy and better deliver solutions, value, and the expertise our customers need.