



Smart Protection:

Intellect-powered surveillance on the high-speed Moscow-St. Petersburg rail corridor



Intellect

PHYSICAL SECURITY
INFORMATION MANAGEMENT

It has always been necessary to protect the passengers and cargo transported by the trains of Russian Railways open joint-stock company, but the threat landscape has changed considerably in recent years. While there are many reasons, the first of these is that with the hustle of modern life and appearance of new technologies, including in rail transport, more and more risks require prevention and timely reaction, and the threat of terrorism remains as important as ever. High-tech security systems have long been an area of interest for the Russian rail transport industry.

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The high-speed Moscow-St. Petersburg rail corridor

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Advanced security equipment has a decade-long history on the Oktyabrskaya Railroad, a set of rail lines covering northwestern Russia, including the corridor between St. Petersburg and Moscow. **The original design concept called for installation of equipment at individual sites:** rail stations, substations, junctures, etc.

But after the bombings of the Nevsky Express train in 2007 and 2009 on the St. Petersburg - Moscow route, this design was revised. The security system was now to include 24-hour surveillance of rail facilities and infrastructure, to eliminate “blind spots” in monitoring and cover the entire route between Russia’s two largest cities. The software chosen for this revamped system was the Axxon Intellect PSIM. The flagship product in the AxxonSoft lineup, Axxon Intellect had acquitted itself well as an effective solution for far-flung sites with incredible levels of complexity.



KEY REQUIREMENTS FOR THE SMART VIDEO ANALYTICS

- 1** First, camera images must be clear regardless of weather, time of day, and lighting.
- 2** Second, video must be automatically analyzed for alarm triggers: the risks related to the human factor (such as operator workload or fatigue) made computers the safer bet for spotting threats that are sometimes invisible even to the human eye.
- 3** And finally, the threat of foreign objects appearing on the railroad made it critical that information be delivered rapidly to operators, who can then warn dispatchers and service crews about the threat in record time.

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SOLUTION

To ensure uninterrupted monitoring of all areas along the Moscow-St. Petersburg corridor, Axxon Intellect was combined with thermal cameras. The Axxon Intellect-powered solution processes incoming data from thermal cameras with innovative detection tools, which allow quickly reacting to dangerous situations and avoiding potential incidents.

Why thermal? Unlike ordinary cameras, thermal imagers capture light in the infrared spectrum and transmit clear images in any weather, at any time of day or night,

and without any additional lighting. The usable observation distance for thermal cameras is 600 meters to 1 kilometer (0.35 to 0.6 miles), which is twelve or more times greater than the range offered by ordinary cameras.

The video analytics in Axxon Intellect allow automatically analyzing video for alarm triggers. This makes work easier for operators, who can concentrate on pre-processed information instead of plucking events out of the flood of raw video.

The system automatically spots the following types of alarm triggers in video:

-  Crossing of zone boundaries
-  Entry / exit from zone
-  Motion in zone
-  Appearance of foreign objects in zone
-  Video background change

FOR NEAR-INSTANT WARNINGS ABOUT LARGE OBJECTS ON RAIL TRACKS, AXSONSOFT SPECIALLY DEVELOPED A MULTISPECTRAL MODULE. THE MODULE DETECTS THE APPEARANCE OF OBJECTS ON RAIL TRACKS AND DISPLAYS A NOTIFICATION TO OPERATORS, WHO CAN QUICKLY RELAY THE INFORMATION TO DISPATCHERS AND SERVICE CREWS.

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EFFECT AND PERSPECTIVES: STATE-OF-THE-ART VIDEO SURVEILLANCE PROTECTS PASSENGER SAFETY

Oktyabrskaya Railroad now has a Situation Center for its high-speed trains, which allows recording, analyzing, and preventing dangerous situations threatening the health and safety of passengers and employees, as well as the integrity of rail equipment.

When the Sapsan trains were introduced, the video recording system proved its effectiveness at monitoring the situation along the entire transit route. Cameras installed in the lead and tail cars capture all events as they occur. Besides averting threats, surveillance video has been useful for post-event analysis and assisting the work of maintenance crews.

State-of-the-art technologies have made Oktyabtskaya Railroad one of the safest ones anywhere today.

The integrated Axxon Intellect-based security system currently stands watch over high-speed rail traffic on the Moscow – St. Petersburg, St. Petersburg – Helsinki, and Moscow – Nizhny Novgorod routes. Russian Railways, the operator of the railroad, plans to build on its positive experience by deploying similar systems at other locations across Russia.

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