



# AUTOMATA NEXUS

## AI-ENHANCED BUILDING MANAGEMENT FOR INTELLIGENT HVAC SYSTEMS

With 20 years of HVAC experience and no software development background, AutomataNexus has leveraged the ease of use of the Hailo AI software Suite, to reduce HVAC service dispatch costs by thousands of dollars per month across multiple deployed sites, while enabling early fault detection that prevents equipment failures, operational downtime, & costly facility damage.

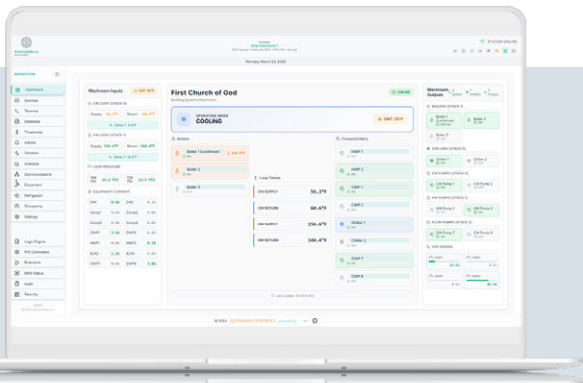
### The Product

**AI-powered building monitoring and automation platform for HVAC control & predictive facility management**

Indiana based AutomataNexus, develops an AI-enhanced building management platform designed to control and optimize HVAC systems in commercial and industrial facilities. The solution combines NexusEdge Controllers, built on Raspberry Pi 5 with the Hailo-8 AI accelerator, with a complete software ecosystem including the NexusBMS building management platform, NexusBMS-Mobile remote monitoring app, and AxonML machine learning framework. NexusApollo is a complementary product for HVAC equipment diagnostic and field troubleshooting.

Installed across mechanical rooms and facility infrastructure, the NexusEdge Controllers directly operate HVAC equipment, including steam boilers, chillers, cooling towers, air handlers, and greenhouse climate systems, while continuously monitoring sensor data from temperature, humidity, vibration, pressure, and electrical current sensors.

The platform integrates remote operation, predictive analytics, equipment diagnostics, and energy optimization into a unified building automation system that can be deployed in facilities ranging from manufacturing clean rooms and laboratories to schools, universities and retirement communities.



*At a senior care facility, AutomataNexus reduced routine HVAC service dispatch costs by **\$5,000-\$6,000 per month**, eliminating the need for frequent on-site recalibration through remote monitoring and control."*

Andrew G. Jewell, Founder & AI Systems Engineer,  
AutomataNexus

## Background

Building automation systems traditionally rely on reactive monitoring and alarm-based maintenance. Failures are often discovered only after equipment stops functioning, sometimes in the middle of the night, resulting in downtime, costly repairs, and inconvenience.

Many facilities still rely on legacy pneumatic controls or basic digital control systems that lack predictive capabilities and require manual troubleshooting by multiple specialized technicians who share the responsibility, which may lead to longer downtime and higher diagnostics and repair costs.

Upgrading these systems with traditional building automation vendors can be prohibitively expensive, often costing tens of thousands of dollars per installation and requiring ongoing vendor service contracts.

For facility managers without HVAC expertise, operating complex mechanical systems becomes increasingly difficult. This creates challenges such as:

- Unexpected HVAC equipment failures
- Inefficient energy consumption
- Limited visibility into system performance
- High maintenance costs due to reactive service calls

AutomataNexus set out to create a cost-effective, intelligent building control platform capable of predicting failures, optimizing system performance, and enabling facilities to manage HVAC operations proactively and cost-efficiently.

## Why AI?

HVAC systems generate large volumes of operational data from sensors and control systems. Artificial intelligence enables this data to be continuously analyzed to detect patterns and anomalies that humans would struggle to identify in real time.

Using machine learning models, AutomataNexus provides:

- **Predictive maintenance** by identifying abnormal vibration, temperature, and electrical signatures that indicate potential equipment failure days or weeks in advance
- **Energy optimization** through intelligent setpoint adjustments and operational pattern analysis
- **Anomaly detection** to identify unusual behavior in pumps, boilers, chillers, and air handlers
- **Facility-specific learning** that adapts models to the operational characteristics of each building

The AI system continuously analyzes operational data while providing recommendations that feed into control logic governing HVAC equipment.

For safety and reliability, the AI analytics are strictly separated from the control layer: the machine learning system generates insights, while dedicated control algorithms operate the equipment.

***“In both healthcare and laboratory environments, predictive AI models running on Hailo-8 enabled early fault detection and remote intervention, preventing equipment failures, eliminating after-hours emergency callouts, and avoiding costly downtime and potential facility damage.”***

Andrew G. Jewell, Founder & AI Systems Engineer, AutomataNexus



**>\$5K / Month**

saved by eliminating routine HVAC service dispatches

**Near 0**

unplanned downtime events in critical environments after deployment

**100%**

remote control and visibility across all HVAC systems

**24-hour**

equipment monitoring preventing failures and facility damage

## Why Edge AI?

**Building automation systems require real-time response and high reliability. Running AI inference directly on edge controllers enables immediate analysis without relying on cloud infrastructure and continuous connectivity.**

Edge AI provides several advantages:

- **Millisecond response time** for critical equipment monitoring
- **Operational continuity during internet outages**
- **Data sovereignty**, ensuring facility data remains on-premises
- **Lower operational costs** by eliminating cloud compute and data transfer fees
- **Enhanced security** for industrial and institutional facilities

By performing AI analysis locally on each controller, AutomataNexus enables scalable and resilient building automation systems that can operate continuously in demanding environments.



*Nearly two decades in HVAC taught me firsthand how costly and disruptive equipment failures can be. Hailo's powerful yet accessible AI platform allowed me to transform that experience into an intelligent building control system that predicts failures, optimizes performance, and delivers real value to facility operators. We're already deploying dozens of controllers today, and with the value customers are seeing, we're scaling toward hundreds of installations."*

Andrew G. Jewell, Founder & AI Systems Engineer, AutomataNexus

## Deployment

**AutomataNexus solutions are currently deployed across 16 commercial facilities in Indiana, with more than 60 NexusEdge controllers installed.**

These systems directly control and monitor **over 113 pieces of HVAC equipment**, including:

- Steam boilers
- Chillers
- Cooling towers
- Air handling units
- Pumps and environmental systems

The platform supports up to **256 I/O points per controller** via custom hardware interfaces and communicates with HVAC equipment using BACnet, Modbus, and proprietary integration protocols.

Deployment environments include:

- Ammunition manufacturing clean rooms
- Industrial laboratories
- Retirement communities
- University greenhouses
- Schools and commercial facilities

**Each installation includes tailored control logic and machine learning models optimized for the specific facility. AutomataNexus trained and compiled 8 different AI models from scratch including Transformers and LSTMs for the HVAC system using the Hailo Dataflow Compiler.**

# Why Hailo?

AutomataNexus selected the Hailo-8 AI accelerator to power the AI inference capabilities of its NexusEdge controllers.

Compared with alternative platforms, Hailo-8 provides:



**High AI performance** capable of running multiple machine learning models simultaneously



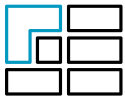
**Exceptional power efficiency** for 24/7 industrial operation



**Cost-effective deployment** for scalable commercial installations



**Seamless integration with the Raspberry Pi ecosystem**

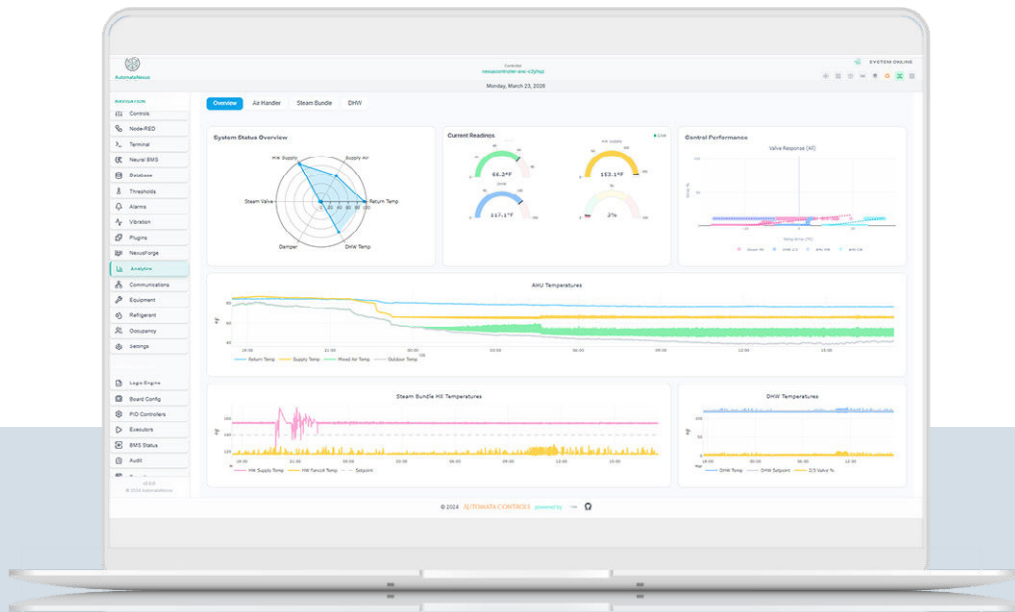


**Comprehensive software tools** that accelerate development and deployment



**Open source software stack** that allows using GenAI coding agents to assist in application development

The Hailo-8 processor enables AutomataNexus to perform continuous predictive analytics directly on edge controllers without introducing computational bottlenecks.



**Hailo is the world's leading enabler for edge AI for non-developers.**  
**Leverage your own domain expertise to improve your offering to your customers.**

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