VMs Lab Report

Maximizing Performance Through Improved Monitoring Protocols

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Inspection and Quality Control Systems

Finally, inspection and quality control are emerging as some of the most sophisticated—and essential—areas of lab automation. A&R Optical Machinery has developed systems designed around an open and interoperable architecture aligned with the DCS industry standard in ophthalmic manufacturing, ensuring compatibility with widely used laboratory management systems.

"This standardized approach enables seamless integration with existing IT environments without requiring complex custom development," said Robert Kohn, president of A&R Optical Machinery. "When needed, we can implement specific communication protocols by adapting only the data exchange layer, rather than modifying the core system. This ensures fast, flexible and maintainable integrations,"

He added that A&R focuses on integration with the lab's central information systems (LMS/ERP) rather than direct connections to individual third-party machines. By leveraging the LMS/ERP as the central orchestration layer, all production data remains centralized, consistent, and fully traceable across the workflow. "As a result, our systems integrate smoothly into existing lab ecosystems, enabling continuous and automated production flows without disrupting established IT or operational infrastructures," Kohn said.

A&R provides total lens inspection solutions and fully automated packaging systems, covering key quality control and end-of-line stages of production.

Kohn said the company's inspection equipment is used at both intermediate control points and final inspection, ensuring lenses meet all quality and cosmetic requirements before moving forward or being shipped, helping to secure consistent quality and reduce redoes.

"In addition, we offer fully automated solutions, including lens marking (AutoInker), automated packaging (AutoPacker), and secondary packaging or overwrapping (MSEVP). These systems are designed to operate semi- or fully automatically, supporting traceability, product, and process consistency," Kohn said.

Robert Kohn

A&R leverages the LMS/ERP as the central orchestration layer creating a centralized data hub.

"Our equipment integrates automated inspection of key parameters, including mapping, optical measurements, cosmetics and geometry. These controls are performed inline, eliminating subjective manual checks and significantly reducing variability."

- Robert Kohn, president of A&R Optical Machinery

He added that A&R systems provide real-time acquisition of machine data, including equipment status, production KPIs, and end-to-end traceability of jobs and individual lenses throughout the process. Kohn said this data is accessible through dynamic dashboards available via cloud-based platforms, enabling laboratories to monitor key indicators such as throughput, machine utilization, and performance trends while continuously optimizing operations.

"In addition, our inspection systems generate SPC (Statistical Process Control) data, allowing early detection of process drifts and quality deviations. This enables faster identification of issues and supports more proactive decision-making on the production floor," Kohn said. "In the near future, the integration of A&R SPC and KPI data into MES360 software of Satisloh will offer labs a broader manufacturing ecosystem to enable advanced analytics and process control."

Kohn feels this integration will support closed-loop approaches, paving the way for predictive maintenance strategies and enhanced process stability, ultimately driving further improvements in reject reduction, consistency, and overall production performance. He added that a key enabler of scalability is the conveyor and logistics layer. These systems are not standardized products but are custom-developed for each lab, reflecting its layout, constraints, and production flow. This tailored approach allows new inspection modules to be integrated over time with minimal disruption.

"In practical terms, additional equipment can be installed on existing lines with a limited footprint, and software upgrades—such as enhanced cosmetic inspection—can be deployed on installed systems. This enables labs to increase capacity and adapt capabilities while maintaining continuity of operations," Kohn said, noting that quality assurance is fully embedded into A&R's inspection systems, which are developed entirely in-house.

He said this allows for control of both hardware and software, ensuring consistency, traceability, and continuous improvement across all inspection steps.

"Our technologies are designed in alignment with international standards such as ISO (International Organization for Standardization) and ANSI (American National Standards Institute), which define measurement methods, tolerances, and defect detection criteria for ophthalmic lenses," Kohn said.

A&R also contributes to ISO technical committees related to ophthalmic inspection, allowing the company to stay closely aligned with evolving industry requirements.

"Our equipment integrates automated inspection of key parameters, including mapping, optical measurements, cosmetics and geometry. These controls are performed inline, eliminating subjective manual checks and significantly reducing variability. Combined with advanced software—such as cosmetic inspection modules—this enables early detection of defects, minimizing remakes and ensuring consistent lens quality across production," Kohn concluded. ■