



# CUSTOMER SUCCESS STORY

 elementary ×  **YAMAHA**



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**YAMAHA ADDS NEXT-GEN ML  
AUTOMATED VISION INSPECTION TO  
CRITICAL QUALITY CONTROL  
PROCESSES**



See this case study on Insights,  
the Elementary blog



Yamaha implements an Elementary next-generation machine vision solution to boost accuracy and reliability of inspections for their ATV and ROV production lines

2023-06-29T21:13:38.187Z > RFL1

**RFL1**  
Read and verify text of any type

**RESULT**  
✓ Pass due to Criteria met

**HISTORY**

- Pass Criteria met, outcome of ✓ Pass JUN 29, 14:13
- Predicted "A WARNING IMPROPER TIRE PRESSURE OR OVERLOADING CAN CAUSE LOSS OF CONTROL. LOSS OF CONTROL CAN RESULT IN SEVERE INJURY OR DEATH. OPERATING TIRE PRESSURE: Set with tires cold
  - Recommended : FRONT : 5.0 psi, (35kPa) REAR : 4.4 psi, (30 kPa)
  - Minimum : FRONT : 4.6 psi, (32 kPa) REAR : 4.0 psi, (27 kPa)
- Never set tire pressure below minimum. It could cause the tire to dislodge from the rim.
- LOADING/TRAILER TOWING
  - Cargo or a trailer can affect stability and handling. Read owner's manual before loading or towing.
  - When riding with cargo or towing a trailer : Reduce speed and allow more room to stop. Avoid hills and rough terrain.
  - Maximum Vehicle Load : 530 lbs, (240 kg) Includes weight of operator, cargo and accessories (and if applicable, trailer tongue weight).

**PASS CRITERIA**  
Set to ✓ Pass if score exceeded 90.55.

INSIGHTS I
REFERENCE R
ZOOM Z
FULL SCREEN F

**CLIENT**

Yamaha Motor Company, ATV and ROV division

**INDUSTRY**

Automotive

**INSPECTION STACK**

8-camera system  
Prism Software  
Edge + Cloud

**VISION TOOLS**

OCR  
Anomaly Detection

# REVOLUTIONIZING QUALITY CONTROL: AI-POWERED VISION FOR SAFER RIDES

Prior to implementing Elementary’s vision solution, Yamaha Motors relied on manual inspectors to verify the accuracy of warning labels placed on their ATV and ROV units, causing fatigue and high turnover among quality control personnel. Elementary helped automate the inspection process and improve traceability throughout the manufacturing process. The warning label inspection is critical for safety and is required to be in compliance with industry safety regulations.

## The task of checking warning labels overwhelms human inspectors

Superior quality and customer satisfaction are at the heart of the corporate mission for Yamaha Motor Company. The company’s all-terrain vehicle (ATV) and recreational off-highway vehicle (ROV) unit produces a variety of different models used in a wide range of ways – from leisure riding to performing utility work. Each vehicle is required to be equipped with a warning label, which is specific to its model and the number of riders it’s designed to carry.



See this case study on Insights, the Elementary blog



## An integral part of the ATV/ROV production line

To ensure compliance with company and industry regulations and to help prevent potential recalls, warning labels must be thoroughly inspected before ATVs and ROVs roll off the assembly line.

Traditionally, the job of visually examining the labels is assigned to quality control inspectors, who are also responsible for checking other technical aspects of the vehicles.

The repetitive work of reviewing warning labels was taking its toll on the company's employees, resulting in high inspector turnover. Inspectors felt like the task of verifying the accuracy of each label's content and placement was taking time away from other aspects of their job and slowing down the overall quality control process.

The ATV and ROV division of the Yamaha Motor Company was looking for a solution that would help them improve the reliability and accuracy of their inspection, while easing the burden on their quality control personnel.



**The Elementary inspection system became an integral part of the ATV/ROV production line, ensuring correct warning labels were placed on the right vehicle models and according to specifications.**



## Elementary adds AI to visual inspections at Yamaha's ATV/ROV production line

Elementary's solution architects began with a review of Yamaha's inspection requirements and an examination of their existing quality control practices and production processes. Elementary then proposed an 8-camera system that would be placed around the ATV/ROV inspection area, with each of the cameras focused on specific areas of the vehicle: front carrier (left and right), rear carrier (left and right), and both front and rear fenders (left and right side for each).

Elementary's full-stack solution provides both all the hardware and software necessary to perform the inspection.

As part of the solution, Elementary engineers integrated the visual inspection system with Yamaha's existing manufacturing execution system (MES). The MES would communicate directly with Elementary to inform the cameras which vehicle model is coming down the production line so that the inspection software would know which type of label it's looking at. For this solution, Elementary used the OCR tool to read the label on the vehicle and confirm that it was correct. If Elementary detected a wrong label, the vehicle would be flagged and then a notification is sent to the operator. The production line is automatically paused to allow the operator to take corrective action on the vehicle.

The Elementary inspection system became an integral part of the ATV/ROV production line to ensure that correct warning labels were placed on the right vehicle models and that placement was correct and according to specifications. The automated system has improved the speed and accuracy of label inspections while providing complete traceability throughout the production process. It also helped free up inspection personnel to focus on other important aspects of the quality control process.

Based on the success of this inspection, Yamaha will be expanding this vision inspection to more production lines.



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### AI-driven quality platform

At **Elementary**, we deliver scalable, flexible, securely connected machine vision solutions to help improve production quality and close the feedback loop on the manufacturing process. The world's leading manufacturers trust Elementary to be their partner in quality to bring efficiency and data-driven insights into their operations.



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