

November 11, 2025
KYOCERA Corporation

Revolutionizing Machine Vision: Kyocera Unveils Triple Lens AI Depth Sensor for Advanced Object Recognition

New high-resolution camera detects fine and semi-transparent objects, paving the way for improved inspection processes, surgical and agricultural robots

Kyocera Corporation (President: Hideo Tanimoto; “Kyocera”) has developed a Triple Lens AI-Based High-Resolution Depth Sensor for close imaging. The camera utilizes three lenses and proprietary AI to recognize semi-transparent, thin, and fine line-shaped objects that were previously difficult to detect with the human eye and traditional stereo cameras. The new Triple Lens AI-Based Depth Sensor accurately measures the distance to and size of such objects with more precision than ever before, tripling its precision measurement of tiny objects often difficult to detect with the human eye, from 1 mm to 0.3 mm. The triple lens is expected to help with inspection processes in manufacturing, improve precision in surgical robotics, and enable easier harvesting with agricultural robots.



Triple Lens AI-Based High-Resolution Depth Sensor

Size: 28mm x 30mm x 40mm (W x D x H)

■Main Features

The triple lens configuration enables precise measurements, including distance and size, of thin, linear objects positioned parallel to the direction between the left and right lenses. This capability allows the measurement of ultra-fine wires and different objects, such as:

- Thin, irregularly shaped linear objects, such as harnesses or ultra-fine wires
- Reflective objects like metal
- Translucent objects like plastic

■ Development Background

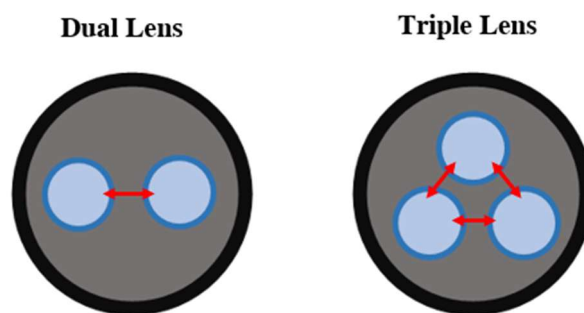
Labor shortages can be a challenge in many countries, particularly developed nations, driving the need for further productivity improvements to compensate. As one solution, advanced vision sensing technology capable of object recognition as a substitute for the human eye is gaining attention.

In 2024, Kyocera developed a Dual Lens [AI-Based High-Resolution Depth Sensor for Close Imaging](#) capable of high-precision distance measurement with 100μm resolution at a 10cm range, allowing distance measurement of tiny objects around 1mm in size, even from reflective or semi-transparent objects, which was difficult for conventional stereo cameras.

However, distance measurement with a dual lens sensor can be challenging for objects with limited surface features or in environments where part of the object is obscured, preventing full recognition. Kyocera's new Triple Lens AI-Based Depth Sensor was created to solve these challenges.

■ Features

Kyocera's new Triple Lens AI-Based Depth Sensor acquires three sets of parallax information—"left-center," "center-right," and "left-right"—from a close distance of 10 cm through the combination of three lenses and proprietary AI. Combining multiple parallax data sets virtually eliminates mismatches and reduces blind spots, significantly improving measurement reliability. It also enables accurate distance measurement for objects that were difficult to measure with a single lens, specifically those with repetitive patterns, partially reflective metals, translucent plastics, and other surfaces lacking distinct features. Kyocera's new AI-Based Depth Sensor can accurately measure distances to thin, irregularly shaped linear objects (e.g., harnesses) and ultra-fine wires with diameters as small as 0.3mm.



※Red arrow: Combination capable of acquiring parallax information

Figure 1: Schematic Diagram of the Dual Lens AI-Based Depth Sensor (Left) and Triple Lens AI-Based Depth Sensor (Right)

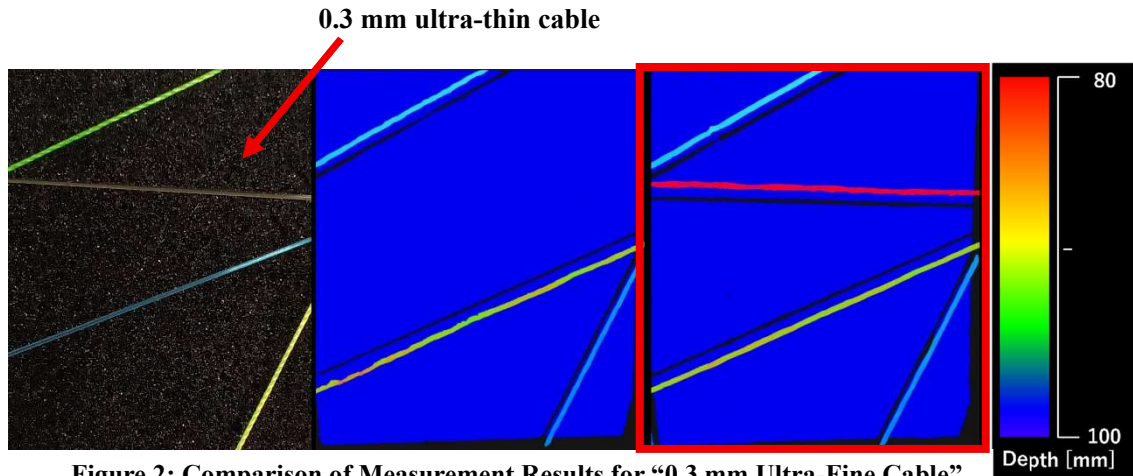


Figure 2: Comparison of Measurement Results for “0.3 mm Ultra-Fine Cable”
Original image (left), Dual Lens AI ranging system (center), Triple Lens AI ranging system (right)

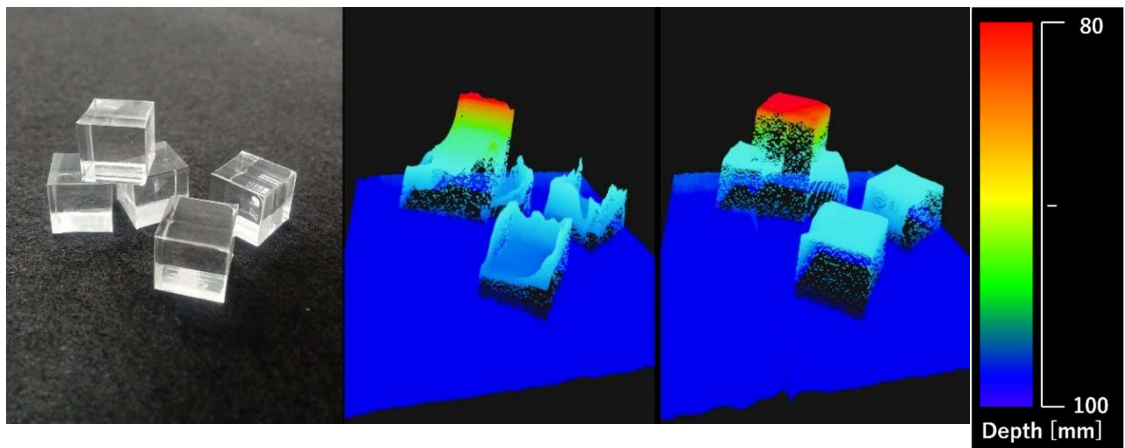


Figure 3: Comparison of Measurement Results for “Overlapping Transparent Cubes”
Original image (left), Dual Lens (center), Triple Lens (right)

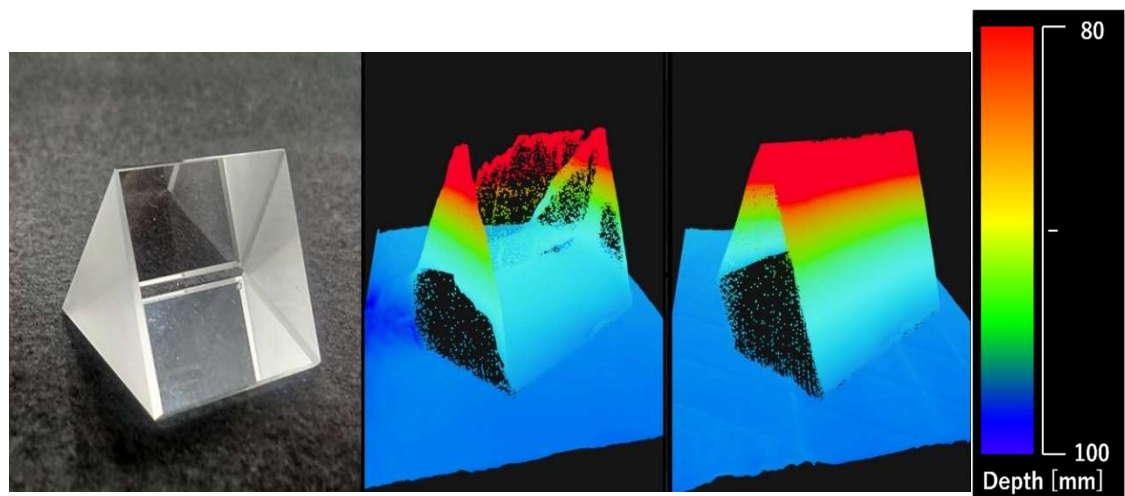


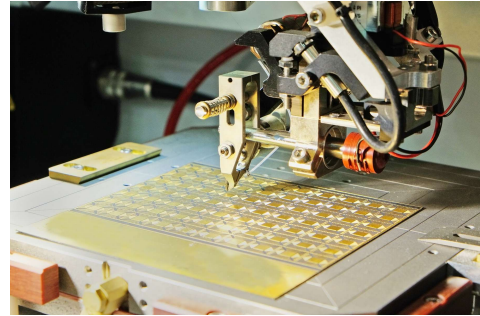
Figure 4: Comparison of Measurement Results for the “Transparent Triangular Prism”
Original image (left), Dual Lens (center), Triple Lens (right)

■ Future Developments

The improved accuracy of Kyocera's Triple Lens AI-Based Depth Sensor lends itself to a diverse range of industrial fields, such as:

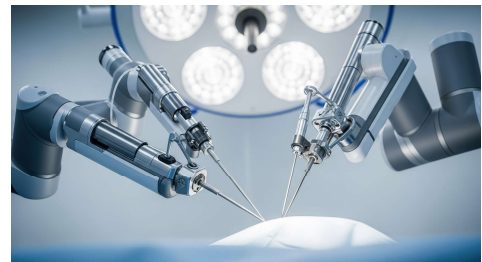
1. Inspection Processes with High Repetition of Patterns

In inspection processes involving objects with highly repetitive patterns, such as electronic circuit boards or textiles, dual lens stereo cameras are prone to mismatching. The triple lens configuration, however, significantly increases measurement accuracy and reliability by utilizing multiple parallax combinations. This enables precise analysis of depth and surface shape, ensuring accurate measurements and minimizing mismatches.



2. Surgical Robots

Thin, highly reflective surgical tools, such as needles and sutures, are often hard to distinguish against their background and can be partially hidden from view. The triple lens configuration, three cameras at different angles, enables precise position recognition by combining information from multiple viewpoints, increasing accuracy and reliability in identifying these instruments.



3. Agricultural Robots

In crop harvesting and other complex environments where fruits and leaves occlude each other, the triple lens camera enables more accurate recognition and precise position measurement with minimal blind spots.



Kyocera will continue to develop technological innovations that create societal value and improve the lives of people around the world.

■ Featured Technology at CES 2026

This technology will be exhibited at one of the world's largest trade shows, CES 2026, held in Las Vegas, Nevada, USA, January 6 -9, 2026 (local time). Kyocera's latest innovations in Underwater Wireless Optical Communication, Millimeter-Wave Sensors, Phased Array

Antenna Modules, and other technologies to support safe, autonomous driving will be showcased at Kyocera's booth #6501, West Hall.

Date	January 6 -9, 2026
Venue	Las Vegas Convention Center
Booth Location	Vehicle Tech & Advanced Mobility Zone, West Hall.
Booth Number	#6501

About KYOCERA

Kyocera Corporation (TOKYO:6971,<https://global.kyocera.com/>), the parent and global headquarters of the Kyocera Group, was founded in 1959 as a producer of fine ceramics (also known as “advanced ceramics”). By combining these engineered materials with metals and integrating them with other technologies, Kyocera has become a leading supplier of industrial and automotive components, semiconductor packages, electronic devices, smart energy systems, printers, copiers, and mobile phones. During the year ended March 31, 2025, the company's consolidated sales revenue totaled 2 trillion yen (approx. US\$13.5 billion*). Kyocera is ranked #1,123 on Forbes magazine's 2025 “Global 2000” list of the world's largest publicly traded companies, and has been named among “The World's 100 Most Sustainably Managed Companies” by The Wall Street Journal

**Conversion is provided based on TTM as of March 31, 2025*

CONTACT:

KYOCERA Corporation (Japan) Corporate Communications

Head Office TEL: +81-(0)75-604-3416 E-mail: webmaster.pressgl@kyocera.jp