

[Provisional Translation Only]

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JDI Develops World's First 3D Imaging Technology Deploying LCD Panels
— Enables Unprecedented, Simultaneous Capture of Video & Depth Maps —

Japan Display Inc. (JDI) has successfully developed the world's first 3D imaging technology that simultaneously captures both normal video and depth maps.¹

In rapidly expanding fields such as autonomous driving and the metaverse, there is a need to accurately gauge the shape and position of people, buildings, colors, and patterns, and import them as information and data. Stereo cameras² and ToF sensors³ are the existing technologies that meet these demands, and with the improvement of resolution and advances in machine learning technology, it has become possible recently to capture advanced information.

Doing so with these conventional technologies, however, requires multiple sensors and cameras to acquire distance, position, and color information. Current offerings have thus become larger and more complex, while product size and position restrictions have become stricter.

By bringing together JDI's LCD technology with the Hitachi, Ltd. R&D Group's technology combining optics and image processing, this new 3D imaging technology makes it possible to capture with a single camera both video data, including color information, and depth maps, including distance and position information.

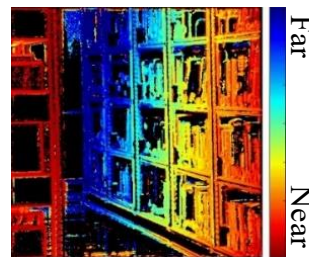
The 3D sensor market is expected to reach approximately 1.4 trillion yen by 2026.⁴ With the goal of market entry in 2024, JDI is investing in performance improvements and the miniaturization of cameras to allow for wider use of this 3D imaging technology in a greater number of products and markets, while working to contribute to the realization of a safer and more secure world.

Depth Map Capture via New 3D Imaging Technology

Object



Depth Map

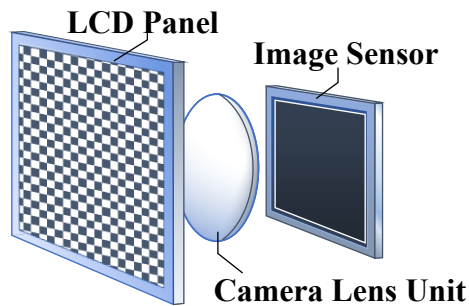


New 3D Imaging Technology Features

With this technology, through the combination of a camera lens unit, image sensor, and LCD panel displaying a special pattern developed by JDI, optical information can be extracted from captured images and turned into location data to generate depth maps.

In addition, it is possible for the 3D imaging camera to take regular video by changing the LCD panel's display mode.

Configuration



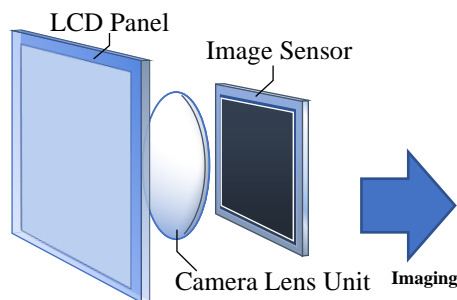
Comparison with Other 3D Sensor Technologies

	New 3D Imaging	Stereo Camera	TOF
Number of Cameras/Sensors	1	2	1
Acquisition of Video & Color Data	Possible	Possible	Impossible
Depth Map Capture	Possible	Possible	Possible

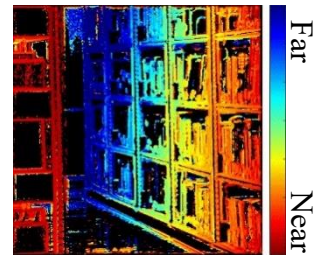
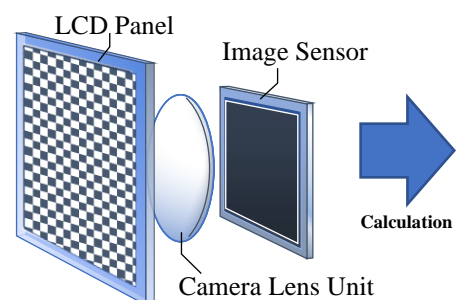
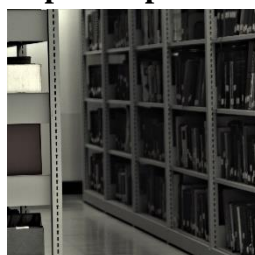
Operational Modes

By switching between the following two modes, the 3D imaging camera can capture normal video or depth maps.

Normal Mode



Depth Map Mode



¹ Expressing the depth of 3D space as distance using color information, etc.

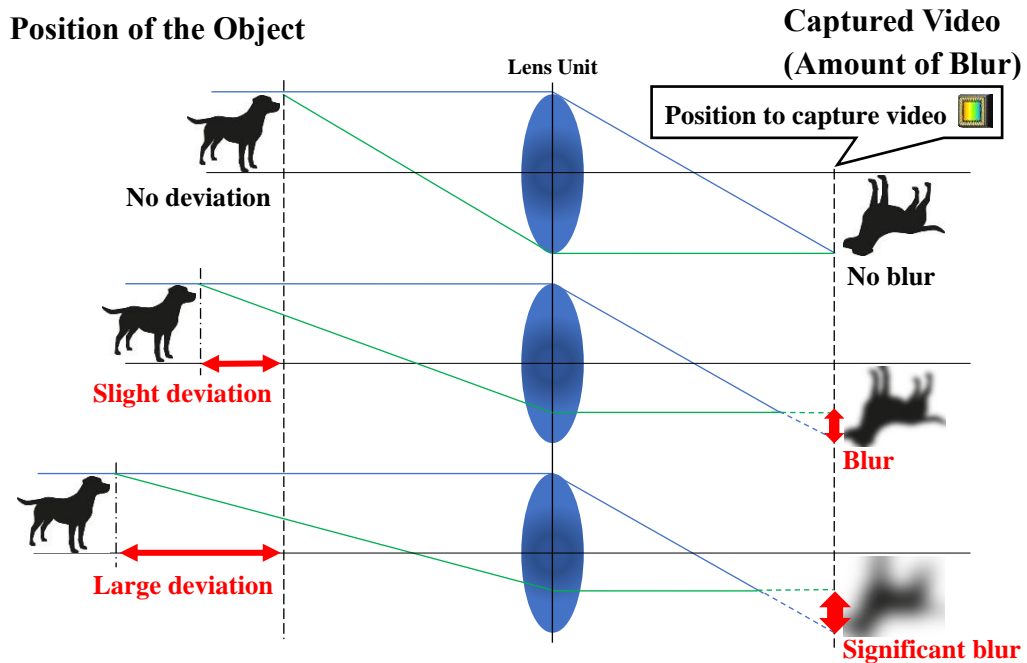
² A camera that uses two cameras to measure the distance to an object using triangulation.

³ Time of Flight. A sensor that measures the distance from the time it takes for the emitted light to be reflected back.

⁴ Figures for global 3D sensor market size are from Global Information.

3D Imaging Technology Depth Map Capture

If the distance of the object in question shifts from the camera's point of focus, blurring occurs in the captured image. Since the amount of blur increases with the amount of deviation, the distance can be calculated from this amount of blur, but this new 3D imaging technology also improves the calculation accuracy by superimposing a special pattern on the LCD panel. A depth map is then constructed from the results of these calculations.



Note: This is a simplified schematic of the new 3D imaging technology for illustrative purposes.

New 3D Imaging Technology Application Areas

Factory Automation & Automated Guided Vehicles



VR/AR



Drones



Surveillance Cameras



Automobiles



Smartphones

