

December 10, 2020

Pioneer Starts Mass Production of Solid-State 3D-LiDAR Using MEMS Mirror

—Made-in-Japan 3D-LiDAR combines Pioneer’s laser technologies and automotive knowhow with Canon’s optical technologies—

Pioneer Smart Sensing Innovations Corporation (“PSSI,” hereafter), a consolidated subsidiary of Pioneer Corporation (“Pioneer,” hereafter), has started mass production of the short-range type of the 3D-LiDAR “1st Model*1” since late November 2020.

The “1st Model” combines the optical disc player and other laser-related technologies as well as other automotive product development and manufacturing knowhow such as car navigation, accumulated by Pioneer over many years with the optical lens technologies of Canon Inc. to realize high performance and compact size. The device consists of a solid-state type that uses a MEMS mirror*2 and a coaxial optical system, enabling it to perform high-speed scanning and generate high-definition point cloud data while detecting obstacles in the scanning range with high accuracy. It will be able to detect pedestrians and bicycles in front or in the blind spots of self-driving buses and low- to medium-speed mobility vehicles with high accuracy. It also works as a fixed sensor for infrastructure and security monitoring by detecting obstacles, foreign objects, and intruders with high accuracy while also taking privacy into consideration.

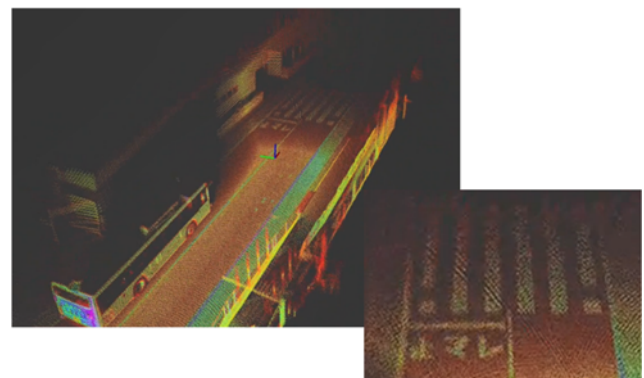
Moreover, by combining 3D-LiDAR with software for “noise removal” and/or “object detection, recognition, and tracking” that is developed together with the hardware (3D-LiDAR), it can be offered as a solution for “object detection, recognition, and tracking” and “3D data generation, and change-point detection.”

All production and quality control of the device will be conducted at Pioneer’s development and production center in Japan (Kawagoe Plant, Saitama Prefecture). We achieve high quality, stable product supply, and product support by complying the strict quality requirements for automotive products.

PSSI will contribute to safe and secure lifestyle creation by using the “1st Model” and other surroundings sensing technologies.

*1: The name of the 3D-LiDAR, known as the “2020 Model” at the time of announcement on December 19, 2019, was changed to the “1st Model”.

*2: MEMS: Micro Electro Mechanical Systems



【3D-LiDAR “1st Model”(Short Range)】

PSSI site URL: <http://autonomousdriving.pioneer/en/?ad=pr>

[Features of the 3D-LiDAR “1st Model”]

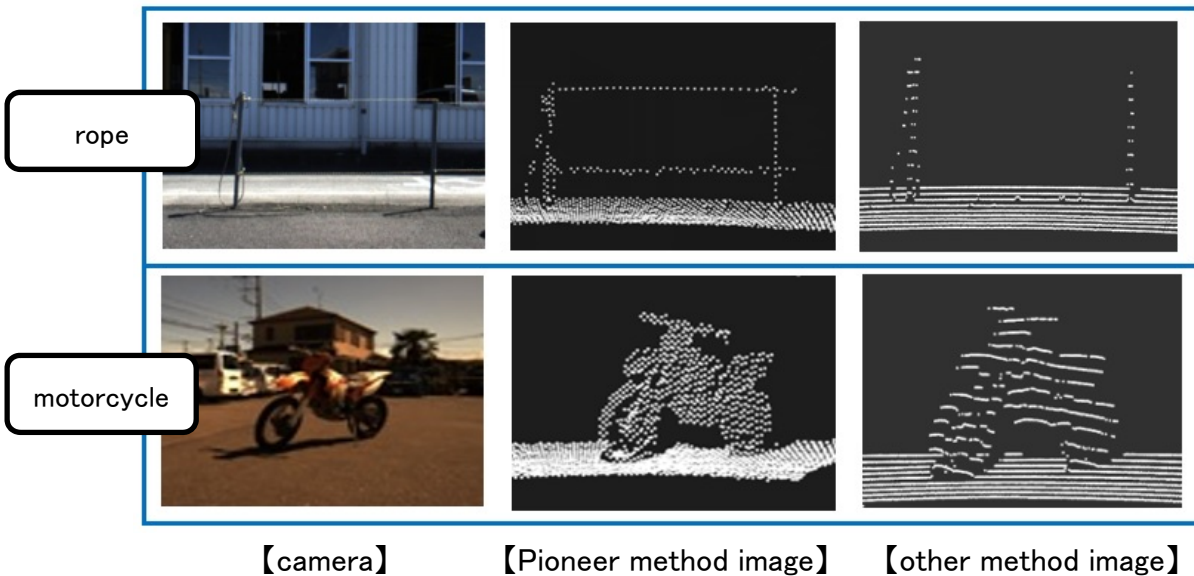
1) Compact size with solid-state type using a MEMS mirror

By using a MEMS mirror system, which consists of one laser diode and one photoreceptor, and coaxial system, it is possible to reduce the number of components and achieve compact size (775cc). Combining this with the medium-range 3D-LiDAR with planned mass production from January 2021 makes it possible to meet a diverse range of needs.



2) Generates high-density, high-definition cloud point data through high-speed scanning

The use of MEMS-mirror-based raster scanning allows the scanning range to be detected quickly, without gaps, and at high resolution, thereby making it possible to generate high-density, high-definition point cloud data.



3) High-accuracy object detection and recognition in combination with Pioneer’s software

The high-density, high-definition point cloud data obtained with the device can be processed in combination with Pioneer’s unique software that uses optical technologies and signal processing technologies developed over many years to facilitate not only the detection and recognition of low-reflective objects, but also high-accuracy detection and recognition in environments such as rain and snowfall.



4) High quality, made-in-Japan product

A new production line dedicated to 3D-LiDAR has been created at Pioneer's Kawagoe Plant, which is the Company's development and production center for automotive products in Japan, and everything from production to quality control is conducted on-site. We achieve high quality, stable product supply, and product support by complying the strict quality requirements for automotive products.

【Main feature of "1st Model"】

	Short Range Type	Medium Range Type (planned mass production from Jan 2021)
Model number	SSL-S01	SSL-M01
Scanning Method	MEMS mirror -based raster scanning method	
Transmission Reception System	Coaxial optical system by single Laser and single APD	
Laser Wavelength	905 nm	
Field of View (H × V)	60° × 30°	30° × 15°
Resolution (H × V)	76 × 76	
Frame Rate	24 Hz	
Measurement Distance	Person : Up to 40 m Vehicle : Up to 70 m	Person : Up to 80 m Vehicle : Up to 120 m
Size (W × D × H)	129.5 × 110.6 × 88.6 mm	129.5 × 110.6 × 88.6 mm

※APD : avalanche photodiode

■About Pioneer Smart Sensing Innovations Corporation

As a new company to take over the business activities which handles autonomous driving-related business in Pioneer, Pioneer Smart Sensing Innovations Corporation" is established in 2019. PSSI has been developing and producing low-cost, compact and high-performance 3D-LiDAR with raster scan type using MEMS mirror, and develops and provides high-precision software utilizing 3D-LiDAR sensors.



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