

December 19, 2019

Pioneer Develops Mass-Production Model of 3D-LiDAR Sensor with Improved Measurement Distance and a Much Compact Size

—Models supporting level-three and above autonomous vehicles will be mass-produced in autumn 2020—

Pioneer Corporation (“Pioneer,” hereafter) and Pioneer Smart Sensing Innovations Corporation (“PSSI,” hereafter), a consolidated subsidiary of Pioneer, have developed a mass-production model of 3D-LiDAR sensor, which is a much compact size, an extended measurement distance and improved performance. The sensor is expected to be equipped in advanced autonomous driving vehicles (supporting level-three and above autonomous vehicles) and will be released in first half of FY2020, and started a full-scale production from autumn 2020.

3D-LiDAR sensors use laser light to detect and accurately measure the distance of objects and can ascertain three-dimensional information related to the surrounding environment in real-time, they are regarded as an indispensable key device for the realization of level-three and above autonomous vehicles (conditional automation). Pioneer and PSSI have been providing various companies with verification models from 2017 to 2018, and continued verifying performance through demonstration testing and other activities.

The 3D-LiDAR sensor, which is to be mass-produced in autumn 2020 (“2020 model”, hereafter) has been adopted Micro Electric Memory Systems (MEMS) mirror-based scanning method. In addition to offering high resolution, it has been downsized to less than 20% of previous model (“2018 model”, hereafter) while achieving 1.5 to 2 times the measurement distance. There are three types of sensors with different angles of view and measurement distances, and an angle type, making it possible to accommodate customer needs by combining the different types. Software that allows the devices to be used for object detection, vehicle position estimation and other applications has also been developed and can be supplied to customers.

Additionally, as well as use in advanced autonomous driving and fleet vehicles, Pioneer and PSSI also assume non-automotive utilization of this 3D-LiDAR such as in security and traffic monitoring applications, and will exhibit a variety of solutions at CES2020 to be held from January 7 next year.

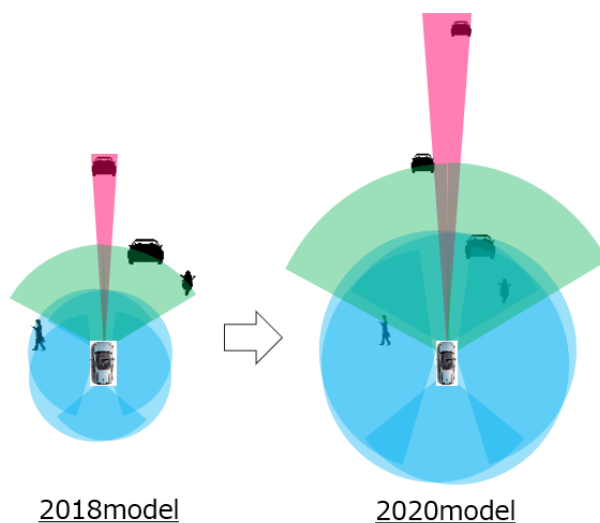


【3D-LiDAR sensor (“2020 model”)】

[Features of the 3D-LiDAR Sensor “2020 Model”]

1) High measurement performance and improved measurement distance surpassed “2018model”

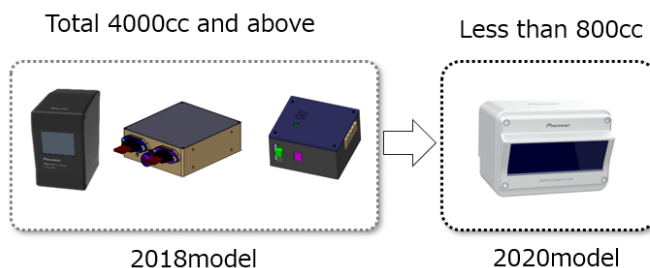
MEMS mirror-based raster scanning method enables detection to be made at high temporal and spatial resolutions. Moreover, with an improved measurement distance of 1.5 to 2 times over “2018model” and other advancements, high-precision detection ability has been achieved for autonomous driving vehicles and a wide range of other applications.



【downsized to less than 20% of “2018 model”】

2) Downsizing and durability for in-vehicle installation

By integrated architecture, it downsized to less than 20% of “2018model”, allowing it to be installed in vehicles. In addition to MEMS mirror-based raster scanning method, the Companies have leveraged its unique know-how as a manufacturer of automotive devices to equip the “2020 Model” with excellent durability.



【improved measurement distance of 1.5 to 2 times over “2018model”】

3) Three types of 3D-LiDAR with different field of view and measurement distances

Three types of sensors with different measurement distances for “Short Range”, “Medium Range”, and “Telescopic”, which is for long distance measurement will be available. Additionally, for “Short Range” and “Medium Range” sensors, there is an angle type that combines two 3D-LiDAR. By combining each of these sensors, Pioneer and PSSI can propose systems that support to various customer needs.

4) Usable for non-automotive utilization

Pioneer and PSSI also expect that the excellent measurement performance of the sensors will also be utilized in a wide range of non-automotive scenarios, such as security and traffic monitoring, ships, agricultural and construction machinery or robotics. Pioneer and PSSI will suggest a range of solutions that realize a safe and secure society.

【Main feature of “2020model”】

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)	Short Range: 60° × 30° Medium Range: 30° × 15° Telescopic: 15° × 7.5° Dual Short Range: 110° × 30° Dual Medium Range: 50° × 15°
Resolution (H × V)	76 × 76
Frame Rate	24 Hz
Number of Point Cloud	138,624 points (per second)
Measurement Distance	Max : about 50 m ~ 170 m Min : about 50 cm ~ 5 m <ul style="list-style-type: none"> ● Sunny, reflectance 50 % ● “2018model” : Max about 25 m ~ 120 m
Dimension	Less than 800 cc <ul style="list-style-type: none"> ● Medium Type / Telescopic : exclude lens part ● “2018model” : More than 4,000 cc

※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 on October 1, 2019. PSSI has been pursuing the development of compact, high-performance, and low-cost MEMS mirror-based 3D-LiDAR sensors, and will churn out from 2020 onwards. At the same time, PSSI is currently developing “high-precision object recognition algorithms”, “vehicle ego-localization algorithms” and “difference extraction of surroundings algorithms”, and utilizing 3D-LiDAR sensors.

URL : <http://autonomousdriving.pioneer/en/>



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