December 20, 2018

Pioneer and Tokyo University of Marine Science and Technology Entered into a Joint Research Agreement on the Ship Automation Using a 3D-LiDAR Sensor

Tokyo, Japan - Pioneer Corporation (hereinafter "Pioneer") and National University Corporation Tokyo University of Marine Science and Technology (hereinafter "TUMSAT") announced today that they entered into a joint research agreement on the Ship automation using 3D-LiDAR sensor on December 14, 2018.

Recently, engineering developments in the autonomous driving of cars have been made around the world. On the other hand, to effort the automation and the development of international standards have also been implemented for ships, which are a means of transportation on waters (seas and rivers), which cover about 70% of the earth's surface. Pioneer and TUMSAT collaborate in this joint research to establish and verification of self-localization technology (ship position estimation technology) and surrounding environment recognition technology for ships using the 3D-LiDAR sensor toward the practical application of future automatic ship. We aim to establish globally basic technologies for automatic ship navigation technology, of which research and development are progressing around the world. Pioneer and TUMSAT have been making efforts to combine Pioneer's 3D-LiDAR sensor and highly accurate self-localization technology accumulated from the development of car navigation systems and TUMSAT's knowledge about ship operations.

Ship to be used in research and development (image)

<Roles in Collaborative Research>

Pioneer

Collecting data using Pioneer's 3D-LiDAR sensors, and developing self-localization technology (ship position estimation) and surrounding environment recognition algorithms.

TUMSAT

Providing environments for testing ships to perform research, and verification on the self-localization technology (ship position estimation) and surrounding environment recognition algorithms based on knowledge about ship operations.

<Background>

  In the shipping industry, the decline in the number of seafarers and their aging have become major issues. In addition, 62%[*1] of shipping accidents occurred globally, and 74%[*2] of such accidents in Japan were caused due to the human error, which needs to be solved. The automatic operations of ships are not only expected to suppress ship accidents due to the human error, but also to improve the working environment in the shipping business and its productivity, and various efforts have been made in major, developed, maritime nations. In Japan, the Ministry of Land, Infrastructure and Transport created a road map in June 2018, for the realization of autonomous ships and many discussions and verifications have been carried out to realize the widespread use in and after 2025.

[*1] Announcement by the European Maritime Safety Agency (data from 2011 to 2015)
[*2] Based on Investigational Data, Current State of Shipping Accidents and Countermeasures, 2017, Japan Coast Guard

■TUMSAT 's project related to autonomous ships

  Aiming to realize an urban waterborne transportation system using small autonomous boats, TUMSAT has been developing an automatic ship control system, including automatic docking/undocking technology to achieve remote navigation and autonomous navigation, and has been conducting research to implement these technologies, including various sensor technologies, wireless communication technology, a maintenance-free ship propulsion system, and other technologies. This research project covers not only technological but also legal and regulatory challenges.

  http://www2.kaiyodai.ac.jp/~shimizu/awpm/awpm.html

■About Pioneer's 3D-LiDAR sensor development

  The 3D-LiDAR sensor uses laser beams to measure distances to objects accurately and grasps information on distances and surroundings in real time and in three dimensions. It is regarded as an essential device for vehicle use for level 3 and higher autonomous driving. Pioneer is developing a high-performance, downsizing, lower price 3D-LiDAR sensor using a MEMS mirror and is proposing a wide variety of use for this product, including automotive applications.

  At CES 2019 to be held in January 2019 in Las Vegas, we will introduce case examples of cooperation with various industries using 3D-LiDAR sensor including this joint research.

  http://autonomousdriving.pioneer/en/
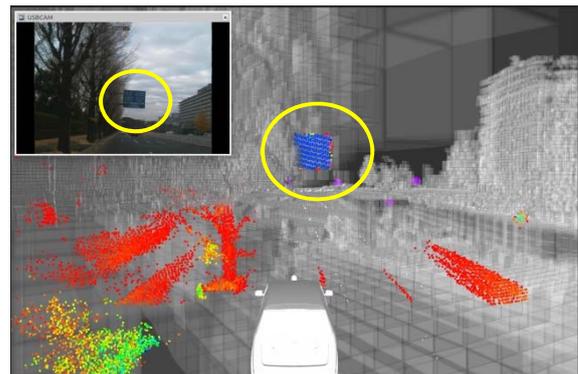
Pioneer's 3D-LiDAR sensor 2018 model   3D point cloud data collected by 3D-LiDAR sensor