MITSUBISHI ELECTRIC
Changes for the Better

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Mitsubishi Electric to Exhibit Autonomous-driving Technologies Incorporated in New xAUTO Test Vehicle

Enable autonomous parking and driving on surface roads

TOKYO, October 21, 2019 – Mitsubishi Electric Corporation (TOKYO: 6503) announced today that it would exhibit the latest version of the xAUTO, a vehicle capable of autonomous driving on surface roads without high-definition maps and autonomous parking both indoors and outdoors, during the 46th Tokyo Motor Show 2019 at the Tokyo Big Sight exhibition complex from October 24 to November 4. The xAUTO is a demonstration car that incorporates Mitsubishi Electric's cutting-edge technologies for autonomous driving.

Mitsubishi Electric xAUTO autonomous-driving demonstration vehicle

Mitsubishi Electric's autonomous driving system is realized with sensor-fusion technologies implemented with peripheral sensors, millimeter-wave radar and cameras, etc. as well as infrastructure-assisted technologies incorporating Centimeter Level Augmentation Service (CLAS) signals from the Quasi Zenith Satellite System and high-definition three-dimensional maps. The system, which is now capable of driving on surface roads without high-definition maps and autonomous parking both indoors and outdoors, has been tested on actual surface roads near Tokyo's waterfront and in the city of Tsukuba, located north of Tokyo. Going forward, Mitsubishi Electric expects to realize fully autonomous driving in designated areas (Autonomous Driving Level 4) by implementing proprietary traffic-control technologies, which are currently deployed for both railways and aircrafts, and artificial-intelligence (AI) technology, namely Maisart®.*

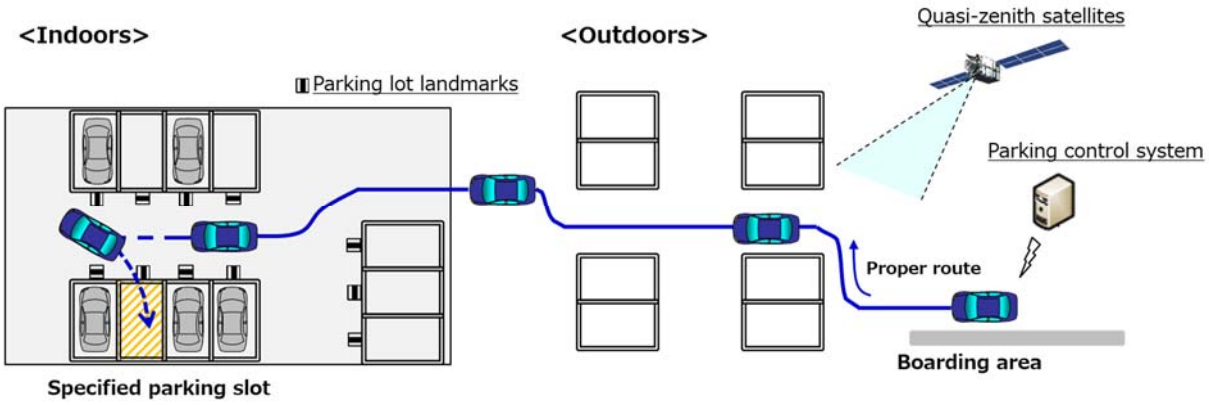
* Mitsubishi Electric's AI creates the State-of-the-ART in technology Maisart

Features

1) Autonomous driving in local areas without high-definition maps

Centimeter-level vehicle trajectory data, which is measured by using a fusion algorithm with CLAS-based positioning data and other vehicle data, such as speed, yaw rate (degree of lateral movement), etc., is recorded several times. Then, these trajectory data is combined into a high-definition local map for use with the autonomous driving system. As a result, the system can work in places where high-definition maps do not exist, such as residential areas, private roads, farm roads, etc.

2) Accurate positioning and routing for autonomous parking both outdoors and indoors



The xAUTO's Automated Valet Parking System calculates the best driving route to a specified parking space based on an operating plan (parking space location, passage points, etc.) provided from a control system. When parking outdoors, the system traces the calculated route with CLAS-based positioning. Indoors, the system accurately calculates positions by using cameras mounted on the xAUTO to detect landmarks installed in the parking lot.

3) Proprietary sensor-fusion technology constantly detects vehicle periphery fast and accurately

In general, autonomous-driving systems require various sensors, such as radars, cameras, etc. However, since data-processing time and data-update cycles vary depending on each sensor's data-gathering

method, recognition errors can occur when differently timed information is processed simultaneously. To overcome this problem, Mitsubishi Electric developed a “sensor-fusion technology” that seamlessly integrates information from various sensors by adjusting the data-output time from each sensor. As a result, the system robustly and accurately detects the situation surrounding the vehicle as well as the vehicle’s speed.

About Maisart

Maisart encompasses Mitsubishi Electric’s proprietary artificial intelligence (AI) technology, including its compact AI, automated design deep-learning algorithm and extra-efficient smart-learning AI. Maisart is an abbreviation for “Mitsubishi Electric's AI creates the State-of-the-ART in technology.” Under the corporate axiom "Original AI technology makes everything smart," the company is leveraging original AI technology and edge computing to make devices smarter and life more secure, intuitive and convenient.

Patents

The technologies presented in this release cover 25 patents in Japan and 6 patents in other countries and an additional 24 patents pending in Japan and 84 patents pending in other countries.

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About Mitsubishi Electric Corporation

With nearly 100 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation (TOKYO: 6503) is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavors to be a global, leading green company, enriching society with technology. The company recorded a revenue of 4,519.9 billion yen (US$ 40.7 billion*) in the fiscal year ended March 31, 2019. For more information visit:
www.MitsubishiElectric.com
*At an exchange rate of 111 yen to the US dollar, the rate given by the Tokyo Foreign Exchange Market on March 31, 2019