

# News Release

**FOR IMMEDIATE RELEASE**

## **Development of an autonomous driving ECU platform for streamlining the development of autonomous driving vehicle applications**

**Tokyo, October 17, 2016** ---Hitachi Automotive Systems, Ltd. and Hitachi Solutions, Ltd. today announced the joint development of a platform for autonomous driving Electronic Control Units (ECUs) that streamlines the development of autonomous driving vehicle applications.

Whereas up until now sensor data from cameras and radar devices and map data had been processed and managed separately for each application, the platform has a jointly developed real-time database that enables high-speed processing and management through organization of the information according to the type of data, shrinking the registration and retrieval time to around 10 microseconds (\*1), one-hundredth the time required by the company's existing system. Moreover, since the data is centrally managed by a real-time database, individual data management functions for each application can be omitted, increasing application development efficiency. In addition, with this platform, a dedicated Software Development Kit (SDK) can be used to efficiently carry out development and operation verification of applications on the ECU, with a general-purpose PC. Hitachi Automotive Systems plans to start evaluations from the end of 2016, and to make the autonomous driving ECUs based on the new platform, together with the SDK, available in July, 2017.

The mainstream configuration for ECUs up until now has been one that processes and manages the various data streams from sensors on an individual application by application basis. However, with so many sensors being used on autonomous driving vehicle systems and the increasing complexity and scale of application functions, the real-time processing of large quantities of data of multiple applications is required. At the same time, it is necessary to cope with interference and malfunctions between applications. The growing complexity and scale of application functions has led to a rapid increase in development man hours, so improving application development efficiency has become an issue.

The platform was developed to respond to such issues by providing the following features and development environment.

### 1. Real-time database

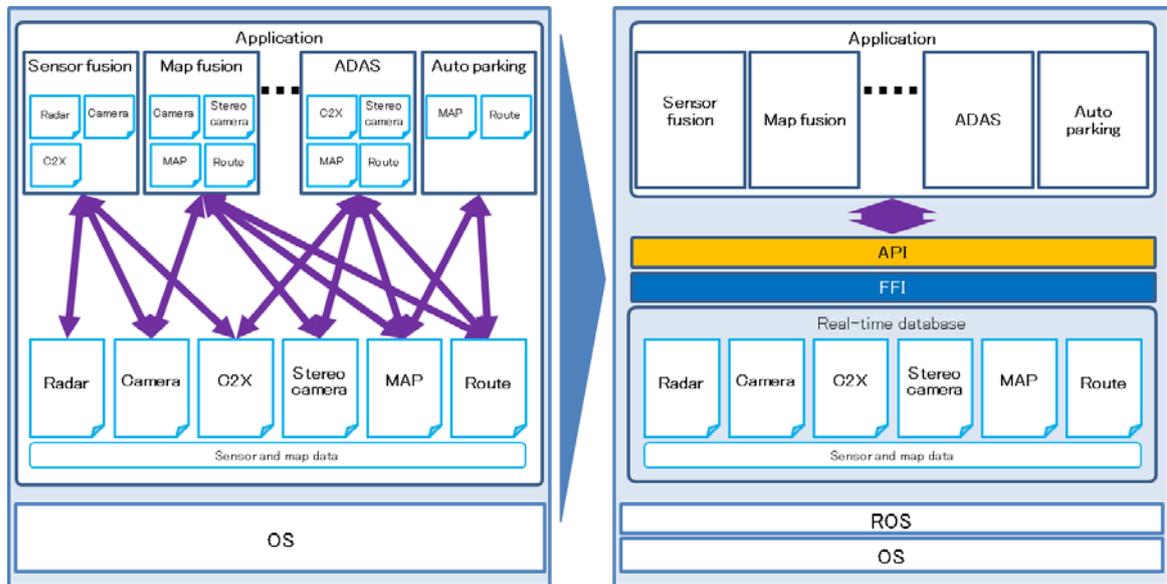
The platform was built by fusing the autonomous driving system development technology of Hitachi Automotive Systems with the embedded database technology of Hitachi Solutions, and is equipped with a real-time database optimized for autonomous driving system applications. While until now it had been necessary to incorporate a data processing and management program for each application, the real-time database centralizes processing and management, making it possible to increase application development efficiency by omitting the data management functions of individual applications. The data registration and retrieval time of a conventional database made it difficult for the high-speed response required to control an autonomous driving vehicle. With the new real-time database in which the information is organized according to the type of data, registration and retrieval time has been shortened to about 10 microseconds, one-hundredth the time required by the company's existing system, providing the requisite high-speed response.

### 2. Software Development Kit (SDK)

The autonomous driving ECU includes a function for working with ROS (Robot Operating System) (\*2), which is widely used in autonomous driving system development. The SDK currently being developed can use ROS for real-time visualization on a PC of sensor data stored in the real-time database. Development efficiency is further aided by the ability to readily port to the ECU applications developed and operation-verified on a PC.

### 3. Freedom From Interference (FFI)

In order to prevent interference between multiple applications in an ECU which can cause applications to stop or malfunction, the system includes an FFI function defined by ISO 26262, an international standard for automotive functional safety. This function ensures the independent execution of each application by scheduling and monitoring the execution time of each application to prevent one application interfering with another. The function thus ensures a safe and stable application operating environment.



Conventional and new autonomous driving ECU architectures

The new platform that has been developed was accomplished through the product and technological capabilities of Hitachi Automotive Systems as a supplier of automotive parts and components and the software development capabilities of Hitachi Solutions, and will contribute to resolving many problems in the autonomous driving vehicle environment possessed by motor vehicle manufacturers. The Hitachi Group will continue to actively work to develop and provide equipment and solutions that support the early commercialization of autonomous driving vehicles.

\*1: 1 microsecond is one-millionth of a second.

\*2: Open source development kit supporting the production of robotic applications (middleware maintained and managed by the Open Source Robotics Foundation developed by Willow Garage of the U.S.)

### **About Hitachi Automotive Systems, Ltd.**

Hitachi Automotive Systems, Ltd. is a wholly owned subsidiary of Hitachi, Ltd., headquartered in Tokyo, Japan. The company is engaged in the development, manufacture, sales and services of automotive components, transportation related components, industrial machines and systems, and offers a wide range of automotive systems including engine management systems, electric power train systems, drive control systems and car information systems. For more information, please visit the company's website at <http://www.hitachi-automotive.co.jp/en/>.

**About Hitachi Solutions, Ltd.**

Hitachi Solutions, Ltd., headquartered in Tokyo, Japan, provides value-driven services throughout the IT life cycle from systems planning to systems integration, operation and maintenance. Hitachi Solutions delivers products and services of superior value to customers worldwide through key subsidiaries in China, Asia, the United States and Europe. The flagship company in the Hitachi Group's information and communication system solutions business, Hitachi Solutions also offers solutions for social innovation such as smart cities. For more information on Hitachi Solutions, please visit: <http://www.hitachi-solutions.com>.

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