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For immediate release

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## **Yokohama Rubber, Alps Alpine, and Zenrin Begin Pilot Testing of System for Tire and Road-Surface Sensing**

Tokyo—The Yokohama Rubber Co., Ltd.; Alps Alpine Co., Ltd.; and Zenrin Co., Ltd., are conducting pilot testing with connecting data obtained from an Internet of Things (IoT) tire fitted with a road surface sensing system to map data and have begun studying new tire business.

This pilot testing involves conducting road-surface sensing with a test vehicle equipped with an advanced tire sensor that is being developed jointly by Yokohama Rubber and Alps Alpine. Connecting the road surface sensing data possessed by the tire sensor to the abundant map data possessed by Zenrin will speed progress in analyzing and accumulating diverse road-surface data and in building a system, and the partners are eyeing the realization of tire business that will consist of proposing new value-added.

### **■Background to the Pilot Testing**

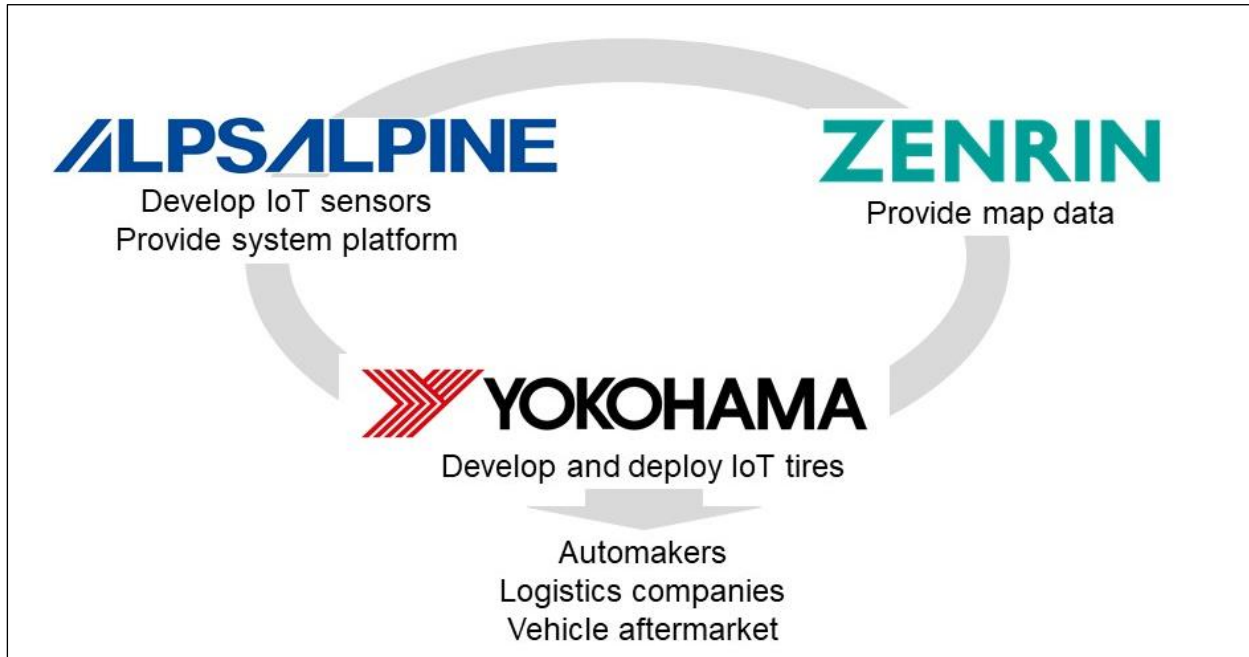
Yokohama Rubber and Alps Alpine, in view of the demand for tires to accommodate CASE\* and IoT, have been conducting research and development since 2019 that addresses the potential for undertaking solutions business that consists of processing and managing with digital tools data that has been obtained by detecting tread wear and road-surface conditions, as well as by established technology for detecting tire air pressure. The partners believe that developing systems and applications for feeding back to users and to autonomously driven vehicles data obtained from tires will be important in addressing new changes in mobility demand. Zenrin has declared a commitment to compiling a library of the real world and, employing original survey methodology, has gathered diverse data across 1,741 cities, towns, and villages in Japan and manages that data in a cartographic database. It has studied the potential for developing new business by undertaking linkages for this cartographic data with a diversity of dynamic data, such as the Big Data possessed by corporations. Now, the three companies, Yokohama Rubber, Alps Alpine, and Zenrin, are advancing research and development on IoT tires by using a test vehicle equipped with an IoT tire to secure diverse road-surface data from public roadways. In addition, combining high-precision maps and traffic control information, they are studying the potential for business in providing services that will help ensure safety and peace of mind in CASE society.

\* The first letters of “connected”, “autonomous”, “shared” and “services” (sometimes only “shared”), and “electric”

**■Future Outlook**

Data analysis through this testing is to lead to the provision of future solutions. Diverse solutions will receive consideration and some will become proposals as safe-driving support and control for autonomous driving vehicles, such as navigation that avoids roadways that have steep inclines and sharp curves upon the detection of severe tread wear or insufficient air pressure and the provision of information about such roadway hazards as frozen road surfaces and potholes.

**■Development Framework**



**■The Roles of Each Company**

|                 |  |
|-----------------|--|
| Yokohama Rubber | <ul style="list-style-type: none"> <li>• Develop technology for detecting tread wear and road-surface conditions</li> <li>• Develop and manufacture sensor-equipped tires</li> <li>• Propose new value-added for the IoT tire</li> </ul>   |
| Alps Alpine     | <ul style="list-style-type: none"> <li>• Develop technology for detecting tread wear and road-surface conditions</li> <li>• Develop and manufacture sensors for detecting tread wear and road-surface conditions</li> <li>• Provide a system platform for uploading data to the Cloud</li> </ul> |
| Zenrin          | <ul style="list-style-type: none"> <li>• Provide detailed maps and roadway information</li> <li>• Incorporate data obtained with the IoT tire in mapping and analyze the data</li> <li>• Propose new value-added for the IoT tire and mapping data</li> </ul>                                    |

**■Outline of Each Company**

Alps Alpine, established in 1948, is a manufacturer of electronic components and automotive information equipment that develops, manufactures, and sells information and communications components used in smartphones and other devices, in-vehicle audio equipment, and information and communications equipment. In addition to sensor development, Alps Alpine has system design and software development capabilities that promise to support synergies in the new tire business model.

Zenrin, founded in 1948 and incorporated in 1961, is a map-information provider that collects and manages diverse data as a platform for knowledge and space-time and provides residential-tract atlases and other maps, cartographic databases, and related content. It possesses an immense store of supplementary information about roadway features, such as routes, inclines, curves, and traffic control, which, in combination with the tire sensor, contributes to achieving high precision in the system.

In 2004, Yokohama Rubber became the first tire maker in Japan to develop a tire pressure monitoring system (TPMS) for passenger cars. Sales of the system, dubbed "AIR watch", began on a limited basis in 2005. "Air watch" received a Good Design Award in 2004, and in 2006 it was named a winner in the "Functional Goods & Accessories" section of the "Nikkan Jidosha Shimbun Car Accessory Awards 2006" sponsored by the automobile industry newspaper the Nikkan Jidosha Shimbun (English version is the Japan Automotive Daily). In addition, since 2003, Yokohama Rubber has been selling its HiTES system as a TPMS to transportation and transport companies that require strict tire management to ensure that their trucks and buses operate more safely with greater running efficiency and lower fuel consumption that helps protect our environment. Linking tire operation history and other vehicle data with Yokohama Rubber's tire management system (TMS) will enable users to analyze vehicle operation trends and receive notification of the proper timing for tire inspection, thereby raising their comprehensive vehicle operation management to a new level and promoting the use of retread tires.