1. **News Release**

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**Renesas Electronics Delivers R-Car-Compatible Connected Car Software Development Tools for Cloud Service Applications Linked with Amazon Web Services Using Vehicle Data**

*Predictive Driving Assistance Technology Realizes Vehicles that Provides Tailored Guidance and Support for Drivers*

**Düsseldorf, October 16, 2018** – To spur the development of cloud-linked services utilizing vehicle data, Renesas Electronics Corporation (TSE: 6723), a premier supplier of advanced semiconductor solutions, today announced the availability of its Connected Car Software Development Tools. Using the new tools, developers working with the R-Car system-on-chip (SoC) family can create applications, such as predictive safety infotainment applications that link dynamic data from the vehicle and the cloud in real time with algorithms developed based on big data in the cloud. This enables out-of-the-box development of innovative applications instead of the traditional approach of simply connecting the vehicle to the cloud, making cloud services available in the vehicle.

Due to the unique challenges of managing vehicle data and the need to develop applications under conditions where in-vehicle testing is difficult or impossible, it has been difficult for software developers to leverage the rich cloud services that Amazon Web Services™ (AWS™) provides through vehicle data at the edge, such as predictive driving support applications. Renesas’ new software development toolset makes it possible to generate new services that combine, in real time, vehicle data (e.g., the driving status and the state of the driver)s and cloud-based data (e.g., construction, congestion, or other road conditions) as well as weather reports and maps.

To link the cloud and the edge, Renesas has adopted AWS’ cloud services and the Greengrass for its software development tools. The software development tools have been validated by both AWS Greengrass and AWS IoT core and have been tested to run on the R-Car Starter Kit under Automotive Grade Linux environment.

“As autonomous driving systems continue to advance, the connected vehicles expect more new key players and to become mainstream,” said **Masayasu Yoshida, senior director of Automotive Technical Customer Engagement Division at Renesas.** “To capitalize on the expertise in vehicle data control, we will continue to work closely with AWS that holds enriched connected services and expertise in edge computing. We are confident that our AWS-linked new software development tools will serve as communication tools and be widely used in the connected vehicle industry.”

“For automotive applications, AWS already provides the AWS IoT Framework for AGL, which enables the integration of AWS IoT core and AWS Greengrass with Automotive Grade Linux (AGL),” said **Muneyuki Watanabe, Director of Strategic Alliance & Partners / Channel, Amazon Web Services Japan K.K.** “I am delighted that Renesas’ new Software Development Tools are providing visibility to vehicle data that could not previously be accessed and imported. We look forward to collaborating with Renesas to help AWS customers leverage these tools to develop new and innovative connected vehicle applications.”

Furthermore, scalability of such applications could be extended to enable coordination with additional data from driver monitoring. For example, predictive driving assistance can be realized in which the application would make calculations based on data from the vehicle, such as information on driver emergencies, driving skills, fuel, or tire pressure, plus forecasts of weather or road conditions from the cloud, and determine the optimal route or provide coaching to the driver. Realization of these new services will not only enhance convenience and safety for drivers, it will also help “mobility businesses” such as automakers, dealerships, insurance companies, and car rental agencies to expand and provide more added value to customers. This leads to accelerate the entry of new businesses in the service layer and bring innovations leading to a new age of mobility.

**Key Features of the New Connected Car Software Development Tools**

**The new toolset includes:**

* A simulator that can generate vehicle data from the accelerator, brake pedals and the steering angle.
* An edge controller that maintains the vehicle data
* A vehicle Application Programming Interface (API) that links with applications such as driver monitoring
* Interfaces that connect vehicle data to the cloud
* **Out-of-the-box cloud service application development using vehicle data on a PC**

The simulator supports 100 frequently-used data types defined in the Vehicle API of the World Wide Web Consortium (W3C), as well as other vehicle APIs. In addition, the simulator can select information on the vehicle surroundings, such as weather or road conditions, to test the application by running a vehicle travel along the road course in accordance with the settings specified by the user. The cloud-lined service applications can be developed on the AWS and deployed to the R-Car Starter Kit that supports lightweight languages including JavaScript and Python, enabling rapid development of cloud-linked application software connected to a cloud service such as AWS. This accelerates the launch of the new services utilizing vehicle data.

* **Low-Risk Investment and Full-Customization Options**

**Evaluation version**: The evaluation version will be made available as complimentary options for the R-Car SoCs as a cost-effective solution that allows developers to familiarize themselves with the types of vehicle data and their uses. There are limitations on the data types and the level of fineness (sampling rate) of the evaluation version, but they can be processed on the R-Car Starter Kit (available separately) and connected to the cloud for testing. In addition to the vehicle data, approximately 100 types of new APIs supplied on the cloud side can be used for simulation. For example, an “[emotion recognition engine](https://www.renesas.com/en/about/press-center/news/2017/news20170719.html)” API that can sense the emotional state of the driver and convey this information to the vehicle is available as an option from Renesas.

**Commercial version**: With support from Renesas’ R-Car Consortium version and its more than 230 members, this version allows developers to customize and optimize in order to support functional safety, from installation through actual utilization with confidence.

* **R-Car Compatibility and Reduced Risk for Greater Peace of Mind**

The finished application software is proven to operate on R-Car H3 and R-Car M3 SoCs, which have a proven track record in a large number of vehicles on the road. The R-Car platform supports robust functional safety and security against cyberattacks and provides a safe and reliable environment for handling vehicle data and personal information.

**Availability**

The evaluation version of the new software development tools, which include R-Car deployment tools, will initially be made available in December 2018 to members of the R-Car Consortium, and a general release of the commercial version is planned for Q1 2019. (Availability is subject to change without notice.)

**About Renesas Electronics Corporation**

Renesas Electronics Corporation ([TSE: 6723](https://urldefense.proofpoint.com/v2/url?u=http-3A__www.jpx.co.jp_english_&d=DwMFAg&c=9wxE0DgWbPxd1HCzjwN8Eaww1--ViDajIU4RXCxgSXE&r=mWLUx0QVt25BWK-MZ29zLPLQHyv8UpUkXzcgXaA3aWQ&m=DYdTH9hu-7LaulV1SVM6YKpZz_t6AqnyxumFHk-LqFg&s=UlMPBZIH1yicvEPu6e6QHB45plYIXPqV-0XV5KGZZl0&e=)) delivers trusted embedded design innovation with complete semiconductor solutions that enable billions of connected, intelligent devices to enhance the way people work and live—securely and safely. A [global](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.renesas.com_en-2Dhq_about_company_profile_global.html&d=DwMFAg&c=9wxE0DgWbPxd1HCzjwN8Eaww1--ViDajIU4RXCxgSXE&r=mWLUx0QVt25BWK-MZ29zLPLQHyv8UpUkXzcgXaA3aWQ&m=DYdTH9hu-7LaulV1SVM6YKpZz_t6AqnyxumFHk-LqFg&s=QqlGBR6MYbo1eiGXo2ZMywSeWE80hPtBOrhrwz73p94&e=) leader in microcontrollers, analog, power and SoC products and integrated platforms, Renesas provides the expertise, quality, and comprehensive solutions for a broad range of Automotive, Industrial, Home Electronics, Office Automation and Information Communication Technology applications to help shape a limitless future. Learn more at [renesas.com](https://urldefense.proofpoint.com/v2/url?u=http-3A__www.renesas.com_&d=DwMFAg&c=9wxE0DgWbPxd1HCzjwN8Eaww1--ViDajIU4RXCxgSXE&r=mWLUx0QVt25BWK-MZ29zLPLQHyv8UpUkXzcgXaA3aWQ&m=DYdTH9hu-7LaulV1SVM6YKpZz_t6AqnyxumFHk-LqFg&s=K6LsuehJosLLwcPcYTcAHq30edFyKPiV7ZQDlE_PO1A&e=).

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