

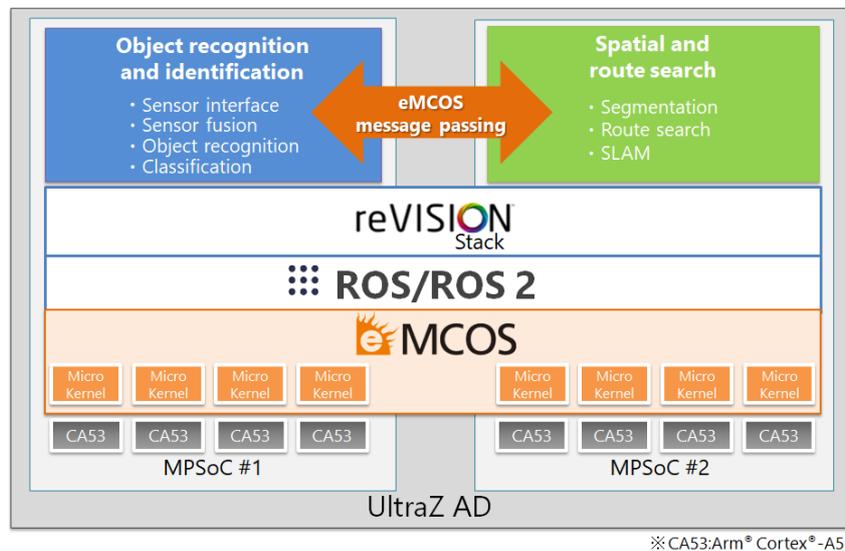
Press Release

eSOL Chosen as RTOS Platform Ecosystem Partner for UltraZ AD Development Board for Advanced Autonomous Driving Featuring Two Xilinx Zynq UltraScale+ MPSoC Chips

eSOL to Supply a Heterogenous Computing RTOS Well Suited to the Concepts behind the Hardware Configuration, Safety Design, and Other Features of the UltraZ AD (a Development Board for the Cooperative Execution of Object Recognition and Identification together with Spatial and Route Search)

Tokyo, Japan. May 8, 2018 -eSOL, a leading developer of real-time embedded software solutions, today announced that it has been chosen as an ecosystem partner and real-time operating system (RTOS) vendor for the UltraZ AD development board for advanced autonomous driving sold by Avnet, Inc. The board features two Xilinx “Zynq® UltraScale+™ MPSoC” (MPSoC) chips with heterogenous multi-core¹ processors. eSOL will supply an RTOS platform based around eMCOS POSIX, a POSIX-compliant RTOS that supports hardware ranging from single-core to heterogenous multi/many-core processors. As the only commercially available RTOS that supports both the Xilinx reVISION™ stack (a framework that makes it easy for embedded systems to utilize image recognition algorithms based on machine learning) and the extensive functions provided by the ROS² open source software, eMCOS POSIX enables the efficient development of highly reliable autonomous driving and autonomous control systems.

UltraZ AD is a deep learning development board targeted at embedded products for autonomous driving and autonomous control. The board has two MPSoC components from Xilinx, equipped with heterogenous multi-core processors for next-generation ADAS and the IoT.



The roles and features of the respective chips are as follows:

- ◆ **MPSoC #1**
Perform object recognition and identification, including sensor ring, sensor fusion, and classification. Can use the Xilinx reVISION stack framework for vision-guided machine learning systems that supports a variety of convolutional neural networks (CNNs), including OpenVX, OpenCV, Caffe, SSD, and YOLO.
- ◆ **MPSoC #2**
Perform spatial and route search (segmentation and SLAM³). An extensive range of ROS/ROS 2 packages are available that run on MPSoC #2.

¹ Heterogenous multi-core: A processor that contains multiple cores of different type. Similarly, a processor that contains multiple cores of the same type is called a “homogenous multi-core processor”.

² Robot Operating System: An application framework for robotics designed to run on UNIX-based OSs.

³ Simultaneous Localization and Mapping

Use of these functions together with eMCOS POSIX enables autonomous driving and autonomous control systems to be developed efficiently while still ensuring high levels of reliability and real-time performance.

eMCOS POSIX has a distributed microkernel architecture with a separate microkernel running on each core. With the scalability to handle heterogenous and homogenous multi/many-core and multi-chip configurations means, eMCOS POSIX combines simplicity with ease of development and implementation, with inter-core communications in the Arm® Cortex®-A53 quad-core processor used in the MPSoCs, and with inter-SoC communications between the two MPSoCs on the UltraZ AD board. The applications that run on the two MPSoCs can then be implemented as if they were using inter-thread communications on a single uniprocessor chip. Furthermore, the proprietary high-speed message passing provides fast coordination between the SoCs without the need for a protocol stack or hypervisor.

The software platform provided by eSOL is based around eMCOS POSIX, and incorporates the eBinder IDE as well as extensive middleware encompassing networking, file systems, USB, and graphics. eBinder integrates with the SDSoC™ development environment for the Zynq-7000 Programmable SoC and MPSoC that comes with the reVISION stack, allowing FPGA libraries created using SDSoC to be imported into the eBinder IDE at a single click. Engineering services are also available, based on the application technology and previous knowledge built up through extensive implementation of ROS and ROS 2 in embedded systems.

eMCOS POSIX was developed using development processes that conform to the ISO 26262 functional safety standard for road vehicles, and product certification at the most stringent safety level (ASIL D) is ongoing. Moreover, eSOL's own development processes for RTOS products are certified as conforming to the IEC 62304 safety standard for medical devices.

Comment from Willard Tu, Sr Director, Automotive Market in Xilinx

“Implementing spatial and route search together with the highly accurate object recognition and identification demanded by advanced autonomous driving systems requires the processing of huge quantities of data, and this is achieved using distributed cooperative processing on two MPSoC chips. eSOL's distributed microkernel architecture enables an autonomous and distributed cooperative configuration, and together with its support for functional safety and expertise in the application of ROS and ROS 2 to embedded systems, it provides a good conceptual fit with the development platform for autonomous driving ECUs provided by UltraZ AD. eSOL is an important ecosystem partner and we intend to continue working with them to contribute to supporting ADAS and autonomous driving system development,” said Willard Tu, Sr Director, Automotive Market in Xilinx Inc.

Comment from Nobuyuki Ueyama, Executive Vice President of eSOL Co., Ltd.

“As the vendor of the RTOS used in the UltraZ AD, eSOL is delighted to have been chosen as an ecosystem partner. The distributed heterogenous computing of eMCOS POSIX has a high degree of affinity with the UltraZ AD and will provide strong support for improving development efficiency, with high reliability and real-time performance being combined with high-speed communications between MPSoC cores and between the MPSoCs themselves,” said Nobuyuki Ueyama, Executive Vice President of eSOL.

■ For Reference

eMCOS

eMCOS is a scalable RTOS for embedded systems that was the first in the world such product available on the market to provide support that extends from single-core to multi/many-core processors. The use of a distributed microkernel architecture unlike that of previous RTOSs enables eMCOS to provide the scalability to support not only different numbers of cores, but also heterogenous hardware configurations with different architectures such as microcontrollers, GPUs, and FPGAs. eMCOS also incorporates eSOL's proprietary semi-priority-based scheduling algorithm (patent numbers 5734941 and 5945617) that combines the real-time capabilities required for embedded systems with the high performance and scalability demanded by many-core processors. It also supports use of existing application development practices with the same programming model and interfaces for single-core and multi-core processors.

▽ For more information about eMCOS, please visit: <https://www.esol.co.jp/embedded/emcos.html>

About eSOL Co., Ltd.

Founded in 1975, eSOL is a leading company in the embedded systems and IoT sector that seeks to create a rich IoT society using its innovative computer technologies. eSOL's software platform products and professional services, centered around its real-time operating system technology, are used worldwide in every field, starting with automotive systems, which conform to the most stringent quality standards, and including industrial equipment, satellites, and digital consumer electronics. In addition to the research and development of its own leading-edge products, and joint research with major manufacturers and universities, eSOL is actively engaged in AUTOSAR and Multi/Many-Core technology standardization activities.

▽ For more information, please visit: <https://www.esol.com/>

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