

RTA-OSEK Extends Virtual Development Support with Real-Time

By
Dr. Oliver Critchley
and Dr. Nigel Tracey,
ETAS

Advance engineering project brings real-time automotive application development support for OSEK & AUTOSAR to the Microsoft Windows PC

Since 2005 the market-leading RTA-OSEK operating system has been available as a native Microsoft Windows PC port. RTA-OSEK for PC uniquely provides the ability to do “virtual” automotive OSEK and AUTOSAR application development on a Microsoft Windows PC. INTECRIO also integrates RTA-OSEK for PC to enable virtual prototyping – providing the same target-identical execution environment on the PC as on ETAS rapid prototyping hardware and in the production ECU. This article introduces the advance engineering project in which the RTA-OSEK for PC solution is being extended to enable it to support hard real-time execution on a standard Microsoft Windows PC.

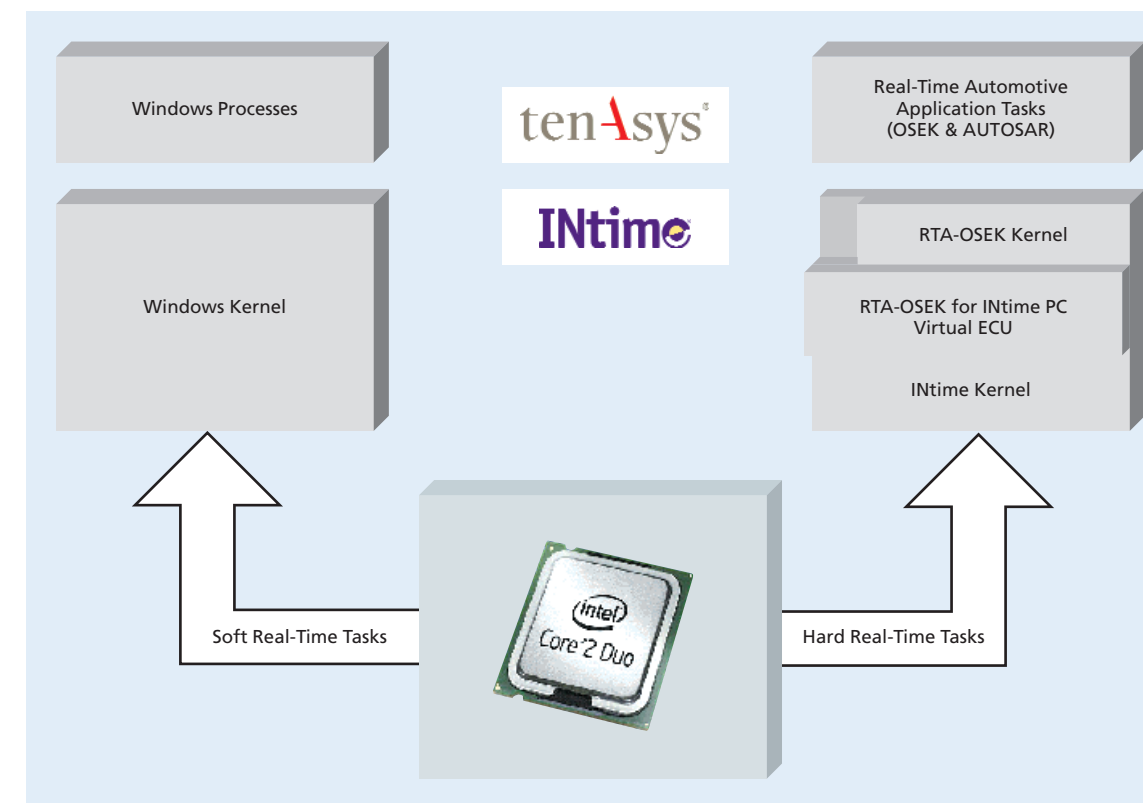
Virtual development: RTA-OSEK for PC

ETAS has provided automotive operating systems for production use for more than 10 years. These operating systems have been deployed in more than 350 million ECUs worldwide, and RTA-OSEK (the latest generation of ETAS operating systems) is available for more than 35 different ECU micro-controllers. With the introduction of RTA-OSEK for PC in 2005, ETAS provided support for “virtual” development – allowing automotive OSEK & AUTOSAR applications to be developed, executed, and tested on a Microsoft Windows PC long before ECU hardware is available. This virtual development could also take advantage of the rich environment of development, debugging, and testing tools available for the Microsoft Windows platform. This support was further extended with the addition of INTECRIO for virtual prototyping, which uses RTA-OSEK for PC as the underlying execution platform.

However, while RTA-OSEK for PC offers many advantages, its usability can be constrained in some circumstances by the lack of deterministic handling of hard real-time tasks within Microsoft Windows. While cycle times of just a few milliseconds were possible in most cases, occasionally RTA-OSEK applications could be blocked for several ms while Microsoft Windows performed some higher priority activities, e.g., swapping to disk, user interface activities, etc. This meant that RTA-OSEK for PC couldn't be used to support the virtual development of applications that required minimal jitter or reliable response times.

Real-time virtual development: RTA-OSEK for INtime PC

An advance ETAS engineering project has been working to provide a solution to the real-time performance challenges presented by Microsoft Windows and to enable support for hard real-time virtual development and prototyping. The solution was found by working with the INtime product from TenAsys Corp. of Beaverton, Oregon. By utilizing INtime to provide a hard real-time deterministic scheduler combined with a modern dual core PC, ETAS has been able to deliver the best of both worlds to developers: reliable time performance and a Microsoft Windows development environment. INtime allows the RTA-OSEK application to run on one microprocessor core in a deterministic real-time fashion while allowing Microsoft Windows to run on the other microprocessor core in the system.



RTA-OSEK for INtime PC.

This allows a single Microsoft Windows PC to be used to perform the dual roles of executing virtual real-time applications and hosting Microsoft Windows-based development tools, e.g., debugging, testing, measurement, calibration tools, prototyping or bypass experimentation tools, etc. In addition to allowing for real-time RTA-OSEK applications on the PC, the use of INtime allows even shorter cycle times to be achieved (1 ms or less).

Virtual development for AUTOSAR

Virtual development becomes of even greater benefit for AUTOSAR applications, where the integration of several AUTOSAR application software components requires significant testing. With the release of RTA-RTE in December 2007, ETAS extended its support for virtual development further into the world of AUTOSAR. RTA-OSEK for PC is already AUTOSAR R1.0-compliant, but RTA-RTE adds support for the AUTOSAR Run-Time Environment for both production ECU usage and for virtual development with RTA-OSEK for PC. This support was extended still further with the release of INTECRIO V3.0, which supports AUTOSAR software component integration for both virtual prototyping and hardware-based rapid prototyping via RTA-OSEK and RTA-RTE.

As with any RTA-OSEK port, RTA-OSEK for INtime PC integrates smoothly with RTA-RTE and therefore provides a deterministic hard real-time virtual development platform for your AUTOSAR applications.