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**European Commission Invests Over €3M for Research and Development
of Time-Predictable Multicore Architecture
for Safety-Critical Systems**

*The Open Group Joins Leading European Manufacturers, Universities, and Technology
Developers to Produce New Time-predictable Architecture
for Safety-Critical Applications*

READING, England and COPENHAGEN, Denmark – [The Open Group](#) and the Technical University of Denmark ([DTU](#)) today announced they have partnered with a consortium of leading European real-time technology developers, industrial suppliers and research organizations to develop a platform architecture for safety-critical real-time systems for avionics, transportation and other safety-related domains. Supported by the European Commission, the Time-Predictable Multicore Architecture for Embedded Systems (T-CREST) project is investing more than €3.6 million (US\$4.6 million) to develop an advanced multicore architecture that will enable substantial performance increases for safety-critical systems. This supplier-independent framework will incorporate newly designed components that provide added predictability and reliability essential for safety-critical applications, while providing improvements in developer productivity, system verification costs, and lower costs for maintenance.

Coordinated by The Open Group with technical leadership from DTU, the T-CREST consortium includes: [University of York](#), [Vienna University of Technology](#) and [Eindhoven University of Technology](#), each of which are renowned centers for research in system platform design; [AbsInt](#), a provider of specialized tools for analyzing safety-critical systems; and industrial solution suppliers [Intecs](#) and [GMV](#), both leading European providers of safety-critical transportation systems. DTU is directing the advanced research in new architecture designs and analysis tools that will enable multicore processors to be utilized for applications where strict predictability, reliability and real-time performance are required by industry.

“The T-CREST project brings together experts addressing each element of system platform design and analysis to develop new approaches for implementing components that support timing analysis and ensure predictability of the overall system,” said David Lounsbury, Chief Technical Officer, The Open Group. “We’re confident these new technologies will make their way into next-generation platform designs to provide needed performance boosts for safety-critical systems, while allowing software developers to verify that systems perform within the precise time intervals demanded by critical systems in avionics, automotive, railway and other safety-related domains.”

The main objective of the T-CREST project is to research and develop novel solutions for time-predictable multicore and many-core system architectures utilizing time-predictable resources for processors, interconnects, memories, and other components. These new solutions will be designed to accommodate analysis of worst-case execution time (WCET) so exact timings of a safety-critical system can be verified, and WCET performance is optimized on multicore systems.

“What’s needed for safety-critical systems today is a paradigm shift,” said Professor Martin Schoeberl, Technical University of Denmark. “Computer architectures today strive to make executing the most common case fast using dynamic features of processors, memories, and interconnects that are difficult to analyze to guarantee specific execution time intervals. In safety-critical systems we have to always consider the worst-case execution time. We need a dramatic change to a new paradigm for designing computer architectures that makes the most demanding parts of the system execute fast and the timing of the whole system easy to analyze.”

The T-CREST project will address key technology areas including: time-predictable processors for optimizing WCET and tightening the WCET bound; asynchronous time-predictable network-on-chip interconnects; time-predictable memory hierarchy with caches organized to speed-up execution time and provide tight WCET bounds; compiler infrastructure with WCET aware optimization methods and timing models to adapt to hardware behavior; and new WCET analysis techniques to exploit the time-predictable architecture. The advancements are being driven by industrial requirements and will be validated with industrial applications being developed by partners in the project. The technologies are expected to dramatically change the way safety-critical systems are designed providing important benefits in performance and managing the complexity of future safety-critical systems.

The T-CREST project is financed in part by the 7th Framework Programme, an initiative of the European Community created to foster European research and development of new technologies, applications and industries. The T-CREST project will run through summer 2014.

More information is available at the T-CREST project website: www.t-crest.org.

About The Open Group

The Open Group is an international vendor- and technology-neutral consortium upon which organizations rely to lead the development of IT standards and certifications, and to provide them with access to key industry peers, suppliers and best practices. The Open Group provides guidance and an open environment in order to ensure interoperability and vendor neutrality. Further information on The Open Group can be found at www.opengroup.org.

About the Technical University of Denmark

The Technical University of Denmark (DTU) is one of the leading Northern European research and education institutions in the engineering field including DTU Informatics, which carries out teaching and research within computer science and information processing with a focus on application within engineering science. DTU educates more than 1,200 Bachelors of Engineering and Science, 1,200 Masters and 400 PhDs a year. The University has 20 departments, a faculty staff of over 1,600 and a student enrollment of over 7,000 (B.Sc, B.Eng and M.Sc). Further information can be found at www.dtu.dk.

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