

Results from MERASA and ParMERASA FP7 Projects

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Providing higher performance than state-of-the-art embedded processors can deliver today will increase safety, comfort, number and quality of services, while also lowering emissions as well as fuel demands for automotive, avionic and automation applications. Such a demand for increased computational performance is widespread among European key industries. Engineers who design hard real-time embedded systems in such embedded domains express a need for several times the performance available today while keeping safety as major criterion. A breakthrough in performance is expected by parallelising hard real-time applications and running them on an embedded multi-core processor, which enables combining the requirements for high-performance with time-predictable execution.

The talk discusses results of the EC FP-7 project MERASA (Multi-Core Execution of Hard Real-Time Applications Supporting Analysability, 2007-2011) and objectives of the new parMERASA project (Multi-Core Execution of Parallelised Hard Real-Time Applications Supporting Analysability, starting Oct. 1, 2011). Both projects target timing analysable systems of parallel hard real-time applications running on a scalable multi-core processor. MERASA delivered a fully timing analysable four-core SMT processor as FPGA prototype together with adapted system software and WCET tools, running a parallelised version of a Honeywell International autonomous flying vehicle code as demonstrator. parMERASA shifts its objectives even more towards parallelisation of hard real-time software. To this end application companies of avionics, automotive, and construction machinery domains cooperate with tool developers and multi-core architects. A software engineering approach will be developed to ease sequential to parallel program transformation y developing and supporting suitable parallel design patterns that are analysable. Verification and profiling tools will be developed, and we aim to provide recommendations to enhance both automotive and avionics standards.

Project webpages: <http://merasa.org>, <http://www.parmerasa.eu>