Real-time Systems Development
-- Verified Committee Meeting --

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- Achieved Milestones
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Achieved Milestones (1/2)
(period May 2010 – Sep. 2010)

• Extension of COTS RTOS
  – μC/OS-II, currently available:
    • simulation environment
    • 2-level FPPS scheduling
    • Global EDF scheduling
    • Two-level Synchronization based on SRP
      – i.e. local level: SRP;
      – global level SIRAP, HSRP, BROE
    • More: http://www.win.tue.nl/~mholende/ucos/
  – Accepted paper (co-authored):
    • Tracing, Visualizing and Measuring the Behavior of Real-Time Systems,
      Workshop on Analysis Tools and Methodologies for Embedded and Real-time Systems (WATERS), July 2010
Achieved Milestones (2/2)
(period May 2010 – May 2010)

• Inter-application Synchronization:
  – Accepted papers:
    • *Extending an HSF-enabled Open Source Real-Time Operating System with Resource Sharing*,
      Workshop on Operating Systems Platforms for Embedded Real-Time Applications (OSPERT), July 2010
    • *Protocol Transparent Resource Sharing in Hierarchically Scheduled Real-Time Systems*,
      IEEE International Conference on Emerging Technologies and Factory Automation (ETFA), September 2010
      (awarded with a IEEE-IES scholarship)
  • Efficient HSF-analysis techniques:
    – Accepted paper (co-authored):
      • *Exploiting Harmonic Periods to Improve Linearly Approximated Response-Time Upper Bounds*,
        ETFA (WiP), September 2010


**Dependability in Automotive Systems**

- AUTOSAR: an OS should prevent timing faults to propagate to other applications.
- Reservations have been studied in AUTOSAR
- Synchronization between components via SRP
  - our protocols are SRP compliant
- Current research topic:
  - How to guarantee temporal isolation in the presence of interacting components?
Main Roadmap
(period May 2010 – May 2011)

• Hierarchical Scheduling:
  – Integration of Time-triggered approaches
  – Design and analysis of application interfaces
    • Capture application’s timing requirements
    • Capture application’s resource requirements
  – Integration of (legacy) COTS applications
  – Multi-resource management:
    • E.g. include Flexray scheduling
Roadmap - Continued

- Multi-resource scheduling
  - E.g. multi-processors, memory, bus, network

- Modes of operation
  - Inter- and intra-application
  - Redistribution of resources

- Criticality versus optimal resource usage

- Multi-level Hierarchical Scheduling