INVITATION

Kick-off event

EtherCAT in
Mobile Applications

February 6, 2013
Frankfurt (Main)

Kick-off event
EtherCAT in Mobile Applications

Mobile applications like tractors, combine harvester, implements, excavators, cranes, wheel loader, dumpers getting more and more complex in the last years. The usage of automation and information technologies brings along yield increases, energy efficiency and enables new functionality.

EtherCAT – the Ethernet fieldbus – provides valuable opportunities with its outstanding performance and flexibility.
The event gives an introduction of the technology, shows application reports and reflects system requirements like engineering, diagnosis, integrated safety and physical layer aspects.

Date: February 06, 2013
Place: Frankfurt (Main) Main station, COSMOPOLITAN

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Target group

Manufacturers and end-users of following industries:
- Agriculture
- Construction
- Forestry
- Mining
- Transportation
- or industries with similar requirements

You are cordially invited!

Free online registration:
www.ethercat.org/2013/mobile_applications

Agenda

Registration and coffee	9:00 a.m.
Start of meeting	9:30 a.m.
Wrap up and end of meeting	5:00 p.m.

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Speakers (presumably):

■ **John Deere GmbH & Co. KG**	Dr. Sobotzik	
■ **BIBA GmbH**	Mr. Lewandowski	Condition-Monitoring of Straddle-Carrier
■ **Lindner Recycling**	Mr. Kordi	Application report: Wood chipper
■ **Vector Informatik GmbH**	Dr. Krauß	Field report: EtherCAT in Test Systems
■ **dSPACE GmbH**	Dr. Schütte	Integration of EtherCAT in advanced Test Systems – Solutions and Challenges
■ **3S-Smart Software Solutions GmbH**	Mr. Werner	Engineering / Control Software / Safety
■ **TÜV Süd**	Mr. Neumann	Safety requirements
■ **EtherCAT Technology Group**	Dr. Beckmann	EtherCAT Technology Introduction
■ **Beckhoff Automation GmbH**	Mr. Sachs	EtherCAT Demonstrator

The Challenge

Demanding requirements for productivity and costs within mobile applications lead to increased complexity of on-board power supply and network architectures. Existing system designs reach their limits:

- Missing bandwidth of existing communication systems (amount of data, cycle times, video broadcasting)
- Software solutions replacing hardware (hardware cost-down)
- Confusing, heterogeneous network architectures (costly gateway solutions)
- Exaggerated life-time costs (engineering, system test, availability, diagnosis, maintenance, machine care)
- Integrated safety

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The Technology: EtherCAT

EtherCAT is an open real-time communication system that offers a quantum leap of performance and bandwidth according to existing systems in mobile applications.

- Reduction to <u>one</u> powerful, future-proofed standard EtherCAT
- International Standard IEC 61158, IEC 61784
- Extremely short cycle times (to <50 μs)
- Deterministic behavior of the full on-board network
- Sub-microsecond precision synchronization
- 100 MBit/s bandwidth, full-duplex standard Ethernet
- Ethernet physical layer, including CAT 5, fiber optics, single pair unshielded cable,...
- Increased availability and reliability of the communication system due to cable redundancy without additional hardware costs in the ECUs
- Integration of existing communication systems (CAN, LIN, FlexRay, ISOBUS, ...)
- Safety over EtherCAT: ISO 26262 ASIL 3, IEC 61508 SIL 3 and ISO 13849 PLe ready

System advantages by EtherCAT

- Components for engineering, system test, data logging with homogeneous interface
- Uniform technology for on-board network and test infrastructure
- Flexible network configuration enables cost-effective adaption of vehicle variants based on unified platform architecture (product line)
- Automatic network configuration, no manual network planning
- Flexible, non-reactive extension of the topology in every phase of development, testing and in the series (face lifting)
- Integrated functional safety with Safety over EtherCAT

Presentation and discussion of new approaches

- **Electrification**
  Close the drive control loop via EtherCAT
  Updating 100 electrical drives each 100 μs
  Axis coupling in software to replace the mechanical line shaft
- **Energy efficiency**
  Improved control performance, engine management
  Hybrid drive systems
  Emission reduction (CO_2 reduction)
- **Connectivity**
  Remote diagnostics and maintenance
  Remote access to production/yield data
  Vehicle-2-Vehicle communication for interaction of vehicles
  (driving in parallel, virtual drawbar)
  Wireless

- **Condition monitoring, measurement**
  Vibration analysis, FFT
  Preventive maintenance
  Substitution of specialized hardware with software modules
- **Video**
  One-wire-solution
  Video broadcasting in parallel with cyclic process data communication
  Image processing (Vision)
  Safety functionality
- **Data management**
  Continuous data storage (Black Box, Vehicle Data Recorder)
  Firmware update via EtherCAT
  Network monitoring
- **Connection to IT-Technologies**
  Infotainment
  Connection to Office applications
  Apps

Contact

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www.ethercat.org/2013/mobile_applications

The images in this flyer show examples of mobile applications.

Location

Cosmopolitan
Am Hauptbahnhof 1
60329 Frankfurt (Main)
Germany

The **EtherCAT Technology Group (ETG)** is an organization in which key user companies from various industries and leading automation suppliers join forces to support, promote and advance the EtherCAT technology. With over 2200 members from 56 countries the EtherCAT Technology Group has become the largest fieldbus organization in the world. Founded in November 2003, it is also the fastest growing fieldbus organization.