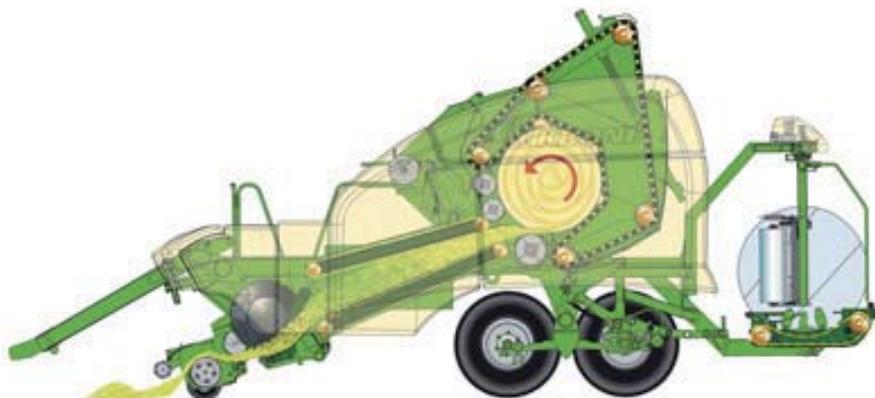


Conference on electronics in mobile machinery



Links

www.vdi-wissensforum.de
www.elektronik-auto.de

“Baden-Baden Special”

This conference organized by VDI-Wissensforum, a daughter of the VDI association of German engineers, comprised three events:

- ◆ 5th conference on electronics in road cars
- ◆ 3rd conference on electronics in commercial vehicles
- ◆ 1st conference on electronics in mobile working machines.

The event took place in Baden-Baden (Germany) in October (10th and 11th).

About 500 participants attended the conferences and visited the joint exhibition. Next year the international VDI “Electronics in vehicles” congress will take place in Baden-Baden in October (16th and 17th).

The Tractor Implement Management (TIM) allows for example a baler to communicate with tractor via the Isobus network allowing the operator to adapt tractor speed automatically to the load on the baler and to prevent overload on the machine

The first session collected more attendees than the room’s capacity of some 160 seats. Peter Hieronymus (Claas) and Dirk Jahn (Putzmeister) introduced general trends and challenges for the electronics in agriculture vehicles respectively in construction machines. One common topic was the introduction of functional safety. But both industries reference different standards, which leads to different solutions. By the way, also in the both other conferences, functional-safety was an important, not to say the dominating, topic.

In one of the speeches, TTTech presented a safety-related controller compliant with ISO 13849 and IEC 61508 respectively IEC 62061. The carmakers have an own safety standard (ISO 26262), which is supported by some micro-controllers implementing specific safety circuitry (see “ISO 26262 compliant micro-controllers”). The agriculture machine industry has also its own safety standard: ISO 25119. Johannes Lange working with

Claas, explained in his paper requirements and applications of functional safety in agriculture engineering. For implements controlling the tractor a safe communication via the Isobus is required, which meets the Performance Level c. It is achieved by transmitting a running number in the periodically transmitted CAN frame. In construction machines, the CANopen Safety protocol is a possible candidate for safe communication. The Institute for Occupational Safety and Health (IFA) has approved this protocol for application up to the Safety Integrity Level 3 comparable with the Performance Level d or e.

Agriculture as well as construction machines make use of CAN-based networks. While in diesel engines commonly the J1939 protocol is preferred, the construction machines often implement CANopen as higher-layer protocol. The agriculture machine industry has developed an open network approach, trademarked as Isobus and internationally standardized in the ISO 11783 series.

Jan Horstmann (Krone) presented Isobus implements (e.g. harvesting machines), which control the speed of the truck via the CAN network compliant with ISO 11783. Of course, wireless truck-to-truck communication was also an important topic: Fendt (Agro) reported about a driverless truck, which follows a manned truck automatically.

Martin Rajek (Liebherr) explained his understanding on long-term and sustainable concepts for mobile machinery. It was a more philosophical paper with a lot of interesting views (e.g. that a software update or review may increase the value of machine during its lifetime). One of the challenges he addressed is the management (testing and validation) of control system variants. This is the same in agriculture and construction machinery: The volume is low and the number of specific solutions is high. Also other speakers (e.g. from Bosch Rexroth, Krone, and TTTech) spoke about the need of scalable control devices, and presented their solutions. ▶

ISO 26262 compliant micro-controllers

Exida (www.exida.com) has certified Freescale's Qorivva MPC5643L micro-controller (MCU) to be compliant with the ISO 26262 functional safety standard. The 32-bit MCU with CAN on chip is designed for use in automotive applications that require automotive safety integrity levels (ASIL) up to D. Typical applications include electric power steering, active suspension, anti-lock braking systems and radar-based advanced driver assistance systems (ADAS).

The MCU is part of the chipmaker's SafeAssure program (www.freescale.com/SafeAssure). It includes also sensors and analog ICs as well as support for functional safety application design. The program is intended to help system developers achieving more easily compliance with functional safety standards such as ISO 26262 and IEC 61508.

A similar program has been introduced by Texas Instruments (www.ti.com). The SafeTI system design packages for functional safety support the standards such as ISO 26262, IEC 60730 (home appliances), and IEC 61508. TI's Hercules family of MCUs is designed for safety applications, but has not been yet certified by an independent authority. Some of these components feature on-chip CAN modules. There are chipsets specifically suitable for motion control applications requiring compliancy to IEC 61508.

According to the ISO standard, functional safety is the absence of unreasonable risk

due to hazards caused by the malfunction of electrical/electronic systems. ISO 26262 targets complete automotive systems and consists of 10 parts, including clauses for hardware, software, their integration and the development and production processes.

Rainer Faller (Exida) said: "The certificate for Freescale's MCU is issued based on a successful assessment of the product design and applied development and production processes against all requirements and work product definitions of ISO 26262 identified as applicable to this micro-controller part. Freescale has done an excellent job with this product."



Continuation desired
Just a couple of months ago, the VDI decided to organize the 1st conference on electronics in mobile machinery. Initiated by Claas, a manufacturer of agriculture trucks and harvesters, and Putzmeister, producer of truck-mounted concrete pumps, as well as some suppliers (e.g. Hydac), the event was rather successful. Many participants appreciated the know-how exchange and the direct talks to engineers from other application fields. Dr. Wolfgang Runge, one of the conferences' mentors, thanked the sponsors and the speakers to make this event happen. "It was just a few month from the idea to the event." No doubt, a follow-up conference on electronics in mobile machinery is desired.



Besides Putzmeister, Liebherr and Wirtgen reported about their strategies to develop electronic control systems for construction machines. Interesting is that both mobile machinery industries develop increasingly the electronic control systems by means of the V-model as the automotive industry is

doing. Vector presented its software tool chain for both industries supporting the specific higher-layer protocols (CANopen, Isobus, and J1939).

The three conferences were accompanied by an exhibition, participated by more than 30 companies. Jetter and TTTech exhibited their control-

ler families for mobile machines with CAN connectivity. Hydac presented its CAN connectable hydraulic and sensor devices. Atmel, Bosch, and Infineon informed about their CAN semiconductor portfolios. Dspace, Etas, and Vector showed their well-known development and testing tools. Holger Zeltwanger