

CAN Newsletter Online

2ND MMC CONFERENCE

Remote diagnostics and network technology

At the 2nd Mobile Machine Control conference, engineers discussed functional safety, remote diagnostics, and possible new communication technologies. CAN FD was mentioned as the solution to one of these problems.

THE 2nd MOBILE MACHINE CONTROL CONFERENCE took place in Nuremberg on June 9 and 10. About 50 engineers participated in the event discussing a broad range of topics. Sponsored by Softing, the two-days event was focused among other topics on functional safety. Two sessions covered this topic. One of the most discussed subjects was the decrease of engineering effort. Bart Oesthoek from Brace Automotive (NL) introduced a concept of system engineering to design functional safety systems. "Using the system engineering and the breakdown approach, the overhead for volume mobile machines can be reduced without compromising on safety," he summarized. Dr. Rolf Jung from STW (DE) went into more details describing how to configure safety parameters using C++ or IEC 61131-3 compliant programming languages. Effort is especially saved when testing is reduced. Michael Schwarz from 3S (DE) presented a functional safety development environment for Codesys. This includes for example UML tools to describe the safety function, static code analyzer, and a test manager. This professional developer tool chain is suitable for the company's Codesys run-time system certified for SIL-2 applications. A CANopen Safety protocol stack is also available. Open source is another option to reduce development effort. Dr. Carsten Emde from OSADL reported about the SIL2LinuxMP project supported by four main sponsors and several reviewing partners. TÜV Rhineland accompanies the project.



The attendees discussed most of the 19 presentations (Photo: Thilo Schumann)

Another important topic of the MMC was remote diagnostic. Some of the papers were linked to on-board diagnostics. Jens Schlenker from HJS (DE) introduced a CAN-based (J1939) communication concept. Peter Subke from Softing (DE) and Juan Aguilar from Sontheim (US) endorsed the ODX (Open Diagnostic Data Exchange) format to also be used in commercial vehicles. Proprietary CAN application layers and CANopen are not yet supported. Liebherr (DE) already uses ODX for its CCU70 control unit, which is available for other machine builders, too.

Liebherr showed the CCU70 module featuring three CAN interfaces in the tabletop exhibition. Other tabletop exhibitors included Emtas/Janz Tec (DE), HBM (DE), Microcontrol (DE), and TKE (FI). Of course, the sponsor Softing also presented its products. HBM exhibited its Somat XR data acquisition system, which is suitable for testing of mobile machines. It comprises a data recorder with three CAN ports and a dedicated CAN interface module featuring CCP and XCP protocol support for calibration purposes. TKE showed its CANopen inclinometer for the first time, which can recognize unintended inclinations.



The attendees discussed most of the 19 presentations (Photo: Thilo Schumann)

"The presentations and discussions at the 2nd MMC conference were on a high level," said Holger Zeltwanger. "However, the participation was not satisfying from an organizer's point-of-view." Those who have missed the conference have the opportunity to buy the conference proceedings from the CiA office. The booklet includes all papers. Additionally, the presentations slides will be provided in pdf format.

Remote diagnostic also means telematics services and cloud services. Dr. Hans Regler (Bauer Maschinen) and Dr. Michael Schmitt (STW) reported upon the experiences made by the mobile machine builder. The non-technical dimension was addressed by Dr. Alexander Duisberg from Bird & Bird. He made it clear that there are a lot of open legal questions such as "Who owns the data?" Privacy and anonymization are two key issues. Matthias Weber from Continental Engineering Services (DE) gave an outlook for on-board and cloud diagnostics in commercial vehicles. "Clearly vehicle uptime in a connected world will dramatically improve compared with current capabilities," Weber stated. He also mentioned the political dimension of remote diagnostics and recommended to implement layered firewalls for security and safety.

Higher bandwidth demands require new communication technologies. Ethernet-based systems will be introduced on the control level. Stefan Taxer from B&R (AT) proposed Powerlink with a single-twisted pair physical connection using the BroadR-Reach technology. The agriculture and forestry machine industry also discusses the use of Ethernet as Frantz Kraatz from the Highschool Osnabrück (DE) reported. However, the experts are still discussing the connector, which should be compatible with the existing CAN-based Isobus solution. The application layer discussion has not yet started.

The other option to improve the data throughput is CAN FD. Uwe Koppe from Microcontrol presented the Universal SDO approach. The basic idea is to implement a source address in the CAN-ID and the destination address in the data field. Additionally, the 1-byte command specifier will be simplified. Of course, the Universal SDO will also allow to segment data and to reassemble them on the

consumer side. Peter Fellmeth from Vector (DE) discussed the requirements on network tools using CAN FD as an example.

The conference also covered other aspects of mobile machine control. Dr. Heikki Saha from TKE proposed an improved management of CANopen-based distributed control systems. Most of the discussed processes are based on off-the-shelf tools with some improvements. Mark Maessen, working with Brace Automotive, reported about his experience with the translation of concept models to production code. He presented a plant model approach, which can identify even unacceptable CAN message delays. Juan Aguilar discussed the use of ODX for automated code generation in a sideline of his paper.



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