

53. IWK

Internationales Wissenschaftliches Kolloquium
International Scientific Colloquium



Faculty of
Mechanical Engineering



.....
PROSPECTS IN MECHANICAL ENGINEERING

8 - 12 September 2008

www.tu-ilmenau.de

th
TECHNISCHE UNIVERSITÄT
ILMENAU

Home / Index:

<http://www.db-thueringen.de/servlets/DocumentServlet?id=17534>

Published by Impressum

Publisher
Herausgeber Der Rektor der Technischen Universität Ilmenau
Univ.-Prof. Dr. rer. nat. habil. Dr. h. c. Prof. h. c. Peter Scharff

Editor
Redaktion Referat Marketing und Studentische Angelegenheiten
Andrea Schneider

Fakultät für Maschinenbau
Univ.-Prof. Dr.-Ing. habil. Peter Kurz,
Univ.-Prof. Dr.-Ing. habil. Rainer Grünwald,
Univ.-Prof. Dr.-Ing. habil. Prof. h. c. Dr. h. c. mult. Gerd Jäger,
Dr.-Ing Beate Schlütter,
Dipl.-Ing. Silke Stauche

Editorial Deadline
Redaktionsschluss 17. August 2008

Publishing House
Verlag Verlag ISLE, Betriebsstätte des ISLE e.V.
Werner-von-Siemens-Str. 16, 98693 Ilmenau

CD-ROM-Version:

Implementation
Realisierung Technische Universität Ilmenau
Christian Weigel, Helge Drumm

Production
Herstellung CDA Datenträger Albrechts GmbH, 98529 Suhl/Albrechts

ISBN: 978-3-938843-40-6 (CD-ROM-Version)

Online-Version:

Implementation
Realisierung Universitätsbibliothek Ilmenau
[ilmedia](#)
Postfach 10 05 65
98684 Ilmenau

© Technische Universität Ilmenau (Thür.) 2008

The content of the CD-ROM and online-documents are copyright protected by law.
Der Inhalt der CD-ROM und die Online-Dokumente sind urheberrechtlich geschützt.

Home / Index:

<http://www.db-thueringen.de/servlets/DocumentServlet?id=17534>

L. Spittel / O. Mollenhauer

Real time networking for distributed controls of multi-coordinate direct drives

In the South of Thuringia many companies are developing and producing direct drives since several years. This drives are used in a wide variety of applications. In order to bundle the development activities and to strengthen the market position of the companies in this region of Thuringia the growth core 'VERDIAN' was established in 2006. VERDIAN stands for '**VER**netzte Integrierte Magnetische **DI**rekt**AN**triebe' – 'Networked integrated magnetic direct drives'.

The direct drives have characteristically a high dynamic range and can also achieve high positioning accuracy. However, the drives have to be controlled by very complex hard- and software components, especially for multi-coordinate magnetic direct drives. If a two(2)-coordinate magnetic direct drive is used, a third coordinate have to be controlled too, e. g. x , y and φ_z . The 3rd coordinate is necessary because the actuator is only guided with air bearings against an x-y plate and the other degrees of freedom are controlled by magnetic fields.

This direct drives are a good example for for the current needs to realise distributed control mechanism. This control model helps to increase the dynamic and positioning characteristics. It also simplifies the production and service processes. Thereby the cost of ownership can reduce too. But it becomes necessary to have a real time network, which can handle the pieces of control information in a fast, strict deterministic and equidistant mode. The development of the Industrial Ethernet seems to be a solution for these networks. Therefore the presentation will give a general view on Industrial Ethernet and more detail on one representative called EtherCAT (Ethernet for Control Automation Technology). It will be explained why EtherCAT was chosen by the VERDIAN consortium based on the needs for controlling the direct drives.

In a further chapter there will be a more detailed explanation about the upcoming distributed control of the multi-coordinate direct drive PPS200 by the TETRA GmbH. It will be shown how EtherCAT can support the development of the distributed control

model based on the current existing control solution. First results by realising the new control solution will be presented too. Furthermore a forecast about future development steps of the direct drives based on EtherCAT in the VERDIAN consortium will be drawn. This includes conclusions on implementing the distributed control model of direct drives.

Authors:

Dipl.-Ing. (BA) Lars Spittel, Dipl.-Ing. Olaf Mollenhauer
TETRA Gesellschaft für Sensorik, Robotik und Automation mbH, Gewerbepark „Am Wald“ 4
D-98693 Ilmenau
Phone: +49-3677-8659-0
Fax: +49-3677-8659-40
E-mail: ls@tetra-ilmenau.com