



Master thesis No. 1078

Time-Sensitive Networking for Magnetostrictive Position Measurement Systems



Methods

Protocol analysis
Software design
Prototype implementation
Programming

Topics

Communication networks

Background

The Balluff GmbH is a global manufacturer of sensors and network components for industrial automation. In current applications, simple sensors and sensor masters are typically connected via IO-Link resp. fieldbus technologies.

As part of the publicly funded research project SUSTAINET, Balluff is investigating the applicability and added value of Time-Sensitive Networking (TSN) in industrial automation. TSN is particularly relevant for time-critical and synchronized applications, such as the coordinated and distributed operation of Balluff's magnetostrictive position measurement systems (BTL) across large distances.

Your Task

The primary task of this Master's thesis is to investigate and implement Time-Sensitive Networking (TSN) integration for BTL measurement systems. This includes analyzing current TSN technologies and microcontrollers, designing and developing a TSN-capable prototype on Texas Instruments Sitara-family hardware, implementing real-time communication protocols and experimentally validating the timing accuracy, reliability, and performance of the system against industrial standards.

Knowledge and Skills Acquired

You will gain insights into Time-Sensitive Networking (TSN), embedded system development with microcontrollers (specifically Texas Instruments Sitara family), real-time communication protocols and precision measurement system integration.

Requirements

Kommunikationsnetze I
Programming Experience in C

Desirable knowledge

Basic knowledge in embedded system programming
Industry automation concepts

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