

ICT Software Engineering
Advanced Thinking

LINEAS[®]
▶ Automotive
Member of the ICT Group

ICT Group
LINEAS[®]
▶ Automotive
Member of the ICT Group

LINEAS-MOST datalogging – powerful test and validation environment

ICTNoviQ **InTraffic** **IMPROVE** **LINEAS** **RialtoSoft** **Xcc Software** **zip**
Advanced Thinking In Motion Quality Services Automotive Member of the ICT Group Member of the ICT Group

ICT Software Engineering - www.ict-se.de LINEAS Automotive GmbH - www.lineas.de/la

ICT Software Engineering
Advanced Thinking

LINEAS[®]
▶ Automotive
Member of the ICT Group

LINEAS-MOST datalogging – powerful test and validation environment

Dipl.-Ing. (Fh) Martin Zappe, Managing Director
Contact:
martin.zappe@lineas.de

ICTNoviQ **InTraffic** **IMPROVE** **LINEAS** **RialtoSoft** **Xcc Software** **zip**
Advanced Thinking In Motion Quality Services Automotive Member of the ICT Group Member of the ICT Group

ICT Software Engineering - www.ict-se.de LINEAS Automotive GmbH - www.lineas.de/la

ICT Software Engineering
Advanced Thinking

Agenda

LINEAS[®]
Automotive
Member of the ICT Group

- LINEAS-ICT „at a glance“
- Yet another „Data-Logger“ & „Test-Suite“
- HW-Concept – Overview
- „Test-Suite“ – development-based experiences
- Summary - Outlook

ICT Software Engineering - www.ict.nl
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
3

ICT Software Engineering
Advanced Thinking

LINEAS-ICT „at a glance“

LINEAS[®]
Automotive
Member of the ICT Group

<p>Unternehmen</p> <ul style="list-style-type: none"> - Hauptsitz in Barendrecht, Niederlande - Gegründet 1978 - notiert an der Amsterdamer Börse - Umsatz 80,6 Mio. EUR (2006) <p>Mitarbeiter</p> <ul style="list-style-type: none"> - ca. 1.000 erfahrene Software-Berater, Software-Ingenieure, Architekten und Projektleiter - Büros in Niederlande, Deutschland, Polen - Nearshore-Entwicklungszentrum in Gdansk, Polen <p>Geschäftsbereiche:</p> <ul style="list-style-type: none"> - ICT Embedded - ICT Solutions - ICT Consultancy - ICT Deutschland 	<p>Branchen & Märkte</p> <ul style="list-style-type: none"> - Traffic & Automotive - Manufacturing - Healthcare - Communications & Multimedia - Defence - Logistics - Energy & Utilities <p>Member of:</p> <ul style="list-style-type: none"> - AUTOSAR Associate Member - Automotive Cluster Berlin Brandenburg - Automotive Engineering Network Südwest (AEN) - GPM Deutsche Gesellschaft für Projektmanagement - GZVB Gesamtzentrum für Verkehr Braunschweig - MOST Cooperation - VDMA - Forum MedTech Pharma e.V. 	<p>Service-Portfolio</p> <p>Beratungsleistungen:</p> <ul style="list-style-type: none"> - Requirements Management - Architecting - Qualitätssicherung - Configuration Management <p>Entwicklungsleistungen:</p> <ul style="list-style-type: none"> - Individuelle Software-Entwicklung - Embedded Systems Entwicklung - IEC61508 SIL 3 konforme Entwicklung - Systemintegration - Systemtest - Resident Engineers <p>Qualität:</p> <ul style="list-style-type: none"> - Entwicklungsprozesse auf CMMi Level 3 testiert - Qualitätsmanagementsystem gemäß ISO 9001:2000
--	--	--

ICT Software Engineering - www.ict.nl
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
4

ICT Software Engineering
Advanced Thinking

Mitarbeiterstruktur

LINEAS[®]
Automotive
Member of the ICT Group

- **Mitarbeiter**
 - Hohe Qualifikation
 - Hohe Motivation
 - Niedrige Fluktuation

- **Fortbildung**
 - Schwerpunkt Softskills

- **Interne Fachforen**
 - zur Wissenweitergabe
 - Erfahrungsaustausch

Kategorie	Anteil
Sonstige	39%
Studium Informatik	39%
Studium Elektrotechnik	10%
Technische Ausbildung / Studium	12%

- Sonstige
- Studium Informatik
- Studium Elektrotechnik
- Technische Ausbildung / Studium

ICT Software Engineering - www.ict.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/la
5

ICT Software Engineering
Advanced Thinking

Kernkompetenzen Automotive

LINEAS[®]
Automotive
Member of the ICT Group

Infotainment

Navigation

MOST[®]

Software Integration

Testautomatisierung

Embedded Systems

AUTOSAR

FlexRay

Modellbasierte Entwicklung

Software Test

ICT Software Engineering - www.ict.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/la
6

ICT Software Engineering
Advanced Thinking

Agenda

LINEAS[®]
Automotive
Member of the ICT Group

- LINEAS-ICT „at a glance“
- **Yet another „Data-Logger“ & „Test-Suite“**
 - **Motivation / Key Requirements**
- HW-Concept – Overview
- „Test-Suite“ – development-based experiences
- Summary - Outlook

ICT Software Engineering - www.ict.de02.05.2008LINEAS Automotive GmbH - www.lineas.de/la# 7

ICT Software Engineering
Advanced Thinking

Motivation

LINEAS[®]
Automotive
Member of the ICT Group

- Recording of a variety of Bussystems + GPIOs
 - MOST, CAN, RS232, GPIO, (FlexRay)
- Identify sporadic Errors
- High resolution time stamps
- Support long-term recording (>12 hours)
- Autonomous power supply
- Catch even the „first message“
- Ability to set Markers
- Usability, Flexibility and Extendability
 - recognize OEM needs from the field !
- Freeze/report environmental conditions like e.g. type of ECU, revision

ICT Software Engineering - www.ict.de02.05.2008LINEAS Automotive GmbH - www.lineas.de/la# 8

ICT Software Engineering
Advanced Thinking

Agenda

LINEAS[®]
Automotive
Member of the ICT Group

- LINEAS-ICT „at a glance“
- Yet another „Data-Logger“ & „Test-Suite“
- **HW-Concept – Overview**
- „Test-Suite“ – development-based experiences
- Summary - Outlook

ICT Software Engineering - www.ict.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
9

ICT Software Engineering
Advanced Thinking

HW-Concept

LINEAS[®]
Automotive
Member of the ICT Group

- IPC-Solution – industrially proved and modular
- Synchronisation via PXI-Backplane
- Baseboard & Extension-Board
- Synchronisation at 100 ns
- Ability to synchronize independent Recorder
- Modularity: High-End Base-Board and low-cost Extension-Board
- Automotive compliance
- Remote control

The diagram illustrates the hardware architecture. A central 'Physical Layer Subsystem' is connected to an 'Extension Board' and a 'Base Board'. The 'Extension Board' is further connected to 'Ext. Co.' and 'Ext. Co.' blocks. The 'Base Board' is connected to 'Ext. Co.' and 'Ext. Co.' blocks. The 'Physical Layer Subsystem' is also connected to 'High Connectors', 'MOST', 'CAN', 'RS232', and 'USB' interfaces.

ICT Software Engineering - www.ict.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
10

ICT Software Engineering
Advanced Thinking

Agenda

LINEAS[®]
Automotive
Member of the ICT Group

- LINEAS-ICT „at a glance“
- Yet another „Data-Logger“ & „Test-Suite“
- HW-Concept – Overview
- **„Test-Suite“ – development-based experiences**
- Summary - Outlook

ICT Software Engineering - www.ictssa.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/la
11

ICT Software Engineering
Advanced Thinking

SW-Concept Basics

LINEAS[®]
Automotive
Member of the ICT Group

- Distributed System / Software Suite
 - Recorder Client
 - Recorder
 - Main Store
- Intercommunication
 - MainStore/FTP-Server <-> Recorder-Client (Win-PC) <-> Recorder (IPC)
 - Communication via TCP/IP (Ethernet)
- Operating System
 - Recorder: Linux
 - GUI's: Windows
 - Database: PostgreSQL

The diagram illustrates the system architecture. On the left, a 'Recorder Client' (represented by a computer monitor) and a 'Recorder' (represented by a hardware device) are connected to a central 'Main Store' (represented by a green cylinder). The Recorder Client and Recorder are connected to the Main Store via bidirectional arrows. To the right of the Main Store is an 'API' (represented by a vertical rectangle), also connected via bidirectional arrows. A bracket on the far right groups the API and Main Store components, with the text 'Analyse: MOST, CAN, RS232, GPIO (FlexRay)' next to it.

ICT Software Engineering - www.ictssa.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/la
12

ICT Software Engineering
Advanced Thinking

**SW-Concept
Features**

LINEAS[®]
Automotive
Member of the ICT Group

- Automatic recorder recognition via IP-Protocol
- Recorder Control via TPC/IP „Recorder-Client“ (Start, Stop, Marker, Traceability ...)
- GUI-based configuration and maintenance of trace files
- Flexible adaptation to car configuration
- Save Recorder-Configuration in Main-Store
- Backup of all HW- and SW-Versions incl. Recorder configuration in Main-Store

ICT Software Engineering - www.ict-se.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
13

ICT Software Engineering
Advanced Thinking

**SW-Concept
Features**

LINEAS[®]
Automotive
Member of the ICT Group

- Main-Store API
 - Support Trace Analysis
 - ECU HW/SW-Version
 - Recorder HW/SW-Version of Recorder and Interface Boards
 - Recorder Configuration
 - Ring-Position of MOST-ECUs and Recorder
 - Car-ID, Driver, Time/Date etc.

The image shows a 'Trace file database update' dialog box with fields for file name, size, configuration, timestamp, user, vehicle ID, and name. Below it is a table with columns for 'Device' and 'TDT'. The table lists an 'Amplifier' device with various attributes like S/N, FW version, and HW version.

Device	TDT
Assignments	
Ring position	403h
Attributes	
Device name	Amplifier
Device S/N	492145
FW version	1.45
HW version	21.E28

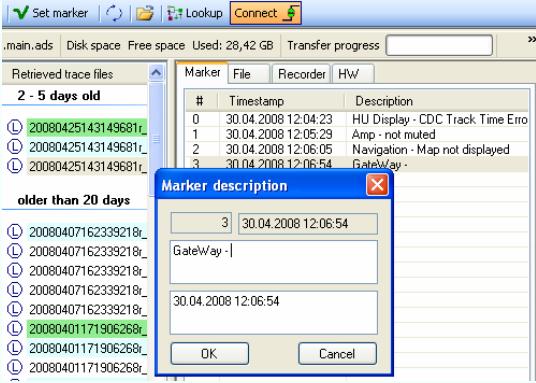
ICT Software Engineering - www.ict-se.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
14

ICT Software Engineering
Advanced Thinking

**SW-Concept
Features**

LINEAS[®]
Automotive
Member of the ICT Group

- Set „error“-Marker (online during recording)
- Use Main store to communicate techn. details between OEM and Supplier



ICT Software Engineering - www.icsa.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
15

ICT Software Engineering
Advanced Thinking

**SW-Concept
Features**

LINEAS[®]
Automotive
Member of the ICT Group

- Multiple usage of MOST-Interface Cards (even at different Ring positions)
- Remote-Update of Recorders via Recorder-Client
- Support of Network Time Portocol (NTP) – synchronization of system time

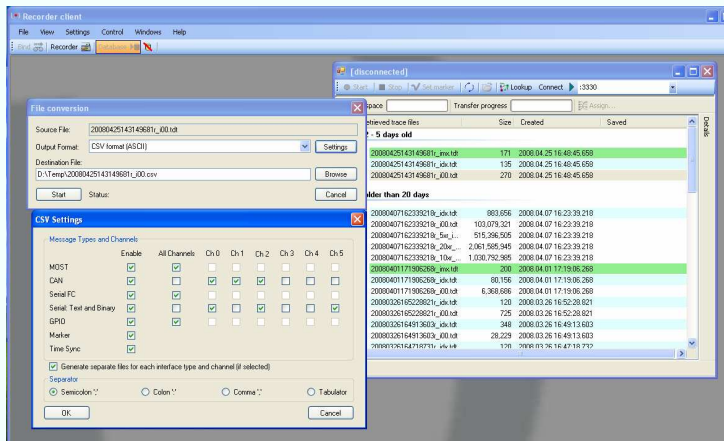
ICT Software Engineering - www.icsa.de
02.05.2008
LINEAS Automotive GmbH - www.lineas.de/au
16

ICT Software Engineering
Advanced Thinking

**SW-Concept
Features**

LINEAS
Automotive
Member of the ICT Group

- Trace-File Management (compact format incl. index)
- Export to 3rd party dataformat



The screenshot shows the Recorder client interface. A 'File conversion' dialog is open, showing source and destination files. Below it, a 'CSV Settings' dialog is open, showing message types and channels. In the background, a window displays a list of trace files with columns for Name, Size, and Created.

ICT Software Engineering
Advanced Thinking

Agenda

LINEAS
Automotive
Member of the ICT Group

- LINEAS-ICT „at a glance“
- Yet another „Data-Logger“ & „Test-Suite“
- HW-Concept – Overview
- „Test-Suite“ – development-based experiences
- **Summary - Outlook**

ICT Software Engineering
Advanced Thinking

Summary / Outlook

LINEAS[®]
Automotive
Member of the ICT Group

- New Age of „Data-Logging“ has started
- Focused on highly sophisticated jobs
- Customizing according to your daily needs – talk to us

Visit us at
booth 1362, hall 1

ICT Software Engineering: www.ict-se.de02.05.2008LINEAS Automotive GmbH: www.lineas.de/la/# 19