Electronic Interlocking Systems for Train Control

Thales LockTrac 6131 ELEKTRA

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> **The fault-tolerant deterministic communication bus from TTTech provides the most reliable real-time foundation for use in LockTrac 6131 ELEKTRA's Field Element Control (FEC) subsystem.**

Dr. Günter Grünsteidl, Technical Manager
Thales Rail Signalling Solutions

LockTrac 6131 ELEKTRA is an electronic interlocking system that provides the highest levels of safety and availability. It has a modular system architecture and is based on modern microprocessor technology. Besides basic interlocking functions, additional features include local and remote control, automatic train operation, integrated block functionality, and an integrated diagnosis system. This entire system can be upgraded to the feature of a management operation system and is approved according to CENELEC standards with safety integrity level 4 (SIL 4).

TTTech has cooperated with Thales Rail Signalling Solutions division to design a generation of electronic interlocking systems. LockTrac 6131 ELEKTRA makes operation and monitoring both safer and easier. The field element control network of Thales's most technologically advanced electronic interlocking system is based on TTTech's deterministic and fault-tolerant "time-triggered" communication networking technology.

Key Benefit 1: Certify Once, Deploy Many Variants
In a time-triggered fault-tolerant network, the connected computers periodically exchange operation critical data messages via synchronous and dual redundant data buses at predefined moments in time. Using predefined data transmission schedules moves design and validation considerations from the late validation and testing phases of system integration to the early stages of design. This removes the need for exhaustive and repetitive re-verification activities for creation and deployment of configuration variants of safety-related systems.
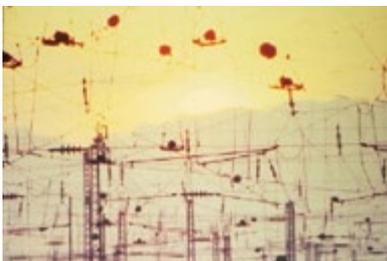
> *Our collaboration with Thales Rail Signalling Solutions has resulted in the design of the technologically most advanced railway signaling system on the train control market today. The use of time-triggered data communication provides maximum scalability for the safety certifiable architecture of the LockTrac 6131 ELEKTRA.*

Georg Stöger, Director Services & Operations Industrial
TTTech Computertechnik AG

Key Benefit 2: Safety and Reliability

Predefined data communication timing not only simplifies system design and variant creation, it also enhances error detection and fault containment, and constitutes a building block for guaranteed real-time message delivery in complex control networks. Random faults in networked components, software errors, and even malicious attacks cannot compromise the real-time performance of a time-triggered network. The predictable deterministic network performance enhances fault handling mechanisms and data consistency services to provide new levels of safety, reliability, and availability.

LockTrac 6131 ELEKTRA has been in commercial production since 2002 and is now widely used in Europe. The Austrian Railways have installed the electronic interlocking system. The Swiss Federal Railways have also put it into operation on several railway lines, e.g. at the Bahn 2000 "Neubaustrecke" (NBS) between Mattstetten-Rothrist, the installation at the Lötschberg base tunnel through the Alps is in preparation. In 2011, the Hungarian MÀV have awarded to Thales contracts for signaling systems and an ETCS Level 2 line control center based on the LockTrac 6131 solution.

◄ AT A GLANCE

► CUSTOMER / PROJECT

Thales Rail Signalling Solutions

► CHALLENGE

The customer wanted to design a generation of electronic interlocking systems that makes operation and monitoring both safer and easier.

► SOLUTION

TTTech's deterministic and fault-tolerant communication networking technology is the base for the field element control network of the most technologically advanced electronic interlocking system by Thales that provides highest levels of safety and availability.

Staying on Track With Robust Embedded Platform Solutions in Advanced Railway Systems

About TTTech Computertechnik AG

TTTech Computertechnik AG is the technology leader in robust networked safety controls. The company's solutions improve the safety and reliability of networked electronic systems in the transportation and industrial segments. Our product portfolio offers best-in-class certifiable products according to IEC 61508, ISO 26262, EN 13849, DO-254 and DO-178B requirements.

TTTech customers win as they deploy dependable networks and real-time controls more efficiently and profitably. Benefits include shorter time-to-market due to re-use of proven architecture and ease of system integration with reduced cost. The company's solutions further support highly scalable and modular open real-time architectures.

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About Thales

Thales is a leading international electronics and systems group, addressing defense, aerospace and security markets worldwide. Thales's leading-edge technology is supported by 22,000 R&D engineers who offer a capability unmatched in Europe to develop and deploy field-proven mission-critical information systems. The group builds its growth on its unique multi-domestic strategy based on trusted partnerships with national customers and market players, while leveraging its global expertise to support local technology and industrial development.

www.thalesgroup.com

About Thales Rail Signalling Solutions

To meet the challenges of globalisation, deregulation and increasing mobility, Thales offers a range of progressive solutions to provide safe, reliable and efficient transportation of passengers and freight through rail networks. With its wide ranging international experience in all areas of transport automation, Thales is a leading global supplier of rail signalling and integrated communications solutions for railways.

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Ensuring Reliable Networks