Technical Innovation Circle for Rail Freight Transport (TIS)
Implementation of Innovations for Rail Freight Wagons

Speakers:

Jürgen Hüllen	Speaker of TIS - VTG AG
Jens-Erik Galdiks	Head of Fleet Technique - SBB Cargo AG
René Höpfner	Project Rail Transport - Bosch Engineering GmbH

Munich | 10th of May 2017

Agenda

A Introduction TIS

B „5L“-Demonstrator Freight Train of SBB Cargo AG / TIS

C Industry platform telematics and sensors in the rail freight sector

D Conclusion and Prospects

Agenda

A Introduction TIS

Jürgen Hüllen

Speaker of TIS

VTG

State of play: The development and implementation of basic innovations for European rail freight are still totally inadequate

Reasons for this **lack of innovative power** in the sector include:

- The European **market** for new rail freight cars is **small** and **volatile**
  ➔ **small volume market /high development costs**.
- Innovations must not restrict **compatibility of freight car deployment**.
- Basic innovation **requirements of wagon keepers are insufficiently defined**.
- **Slow implementation** of basic innovations.
- Innovations must generate **economic gains for wagon keepers**.
- Economic **benefit** of a freight wagon innovation is **not** necessarily reaped by **wagon keepers**.

This calls for a new approach to innovation across the whole industry.

Source: White Paper on Innovative Rail Freight Wagon 2030, presented at Innotrans, Berlin, on 20/09/2012

Growth Factors for Rail Freight Traffics - Initiative „5L“

Participants of the Technical Innovation Circle for Rail Freight Transport

TIS Zukunftsinitiative 5L

Wagon keepers	Railway undertakings	Shippers	Wagon/Component manufacturers
BASF	BASF	BASF	KNORR BREMSE
DB Cargo Deutsche Bahn Gruppe	DB Cargo Deutsche Bahn Gruppe		WAGGONBAU GRAAFF Member of the VTG Group
GATX			WBN Tradition seit 1835
SBB CFF FFS Cargo	SBB CFF FFS Cargo		
VTG			
wascosa			

Academic support

TECHNISCHE UNIVERSITÄT DRESDEN

TU berlin

Project management

hwh Gesellschaft für Transport- und Unternehmensberatung mbH

In 2016 TIS has initiated new innovation activities

Previous topics and working groups

Innovative Bogies and Brake Systems	Telematics and Sensor Technology	Innovative Coupling Systems	Innovative Constructional Systems	Light Weight Construction	LCC-Models Components and Wagons

Transition into new topics / working groups

Innovative Bogies and Brake Systems	Wagon Intelligence	Automated Operational Processes*	Wagon Design	LCC-Models Components and Wagons
▪ Innovative bogies and brake systems will be tested in “5L”-demonstrator ▪ Support of industry in R&D of innovative disc brakes	▪ Works on standardisation of data exchange will be continued together with ITSS	▪ New project; integration of project “innovative coupling systems” ▪ Investigation of implement-tation of power supply line and data bus	▪ Aggregation of working group innovative constructional systems and light weight construction into one project ▪ Objective: Standardized, light weight underframe with variable innovative constructional systems	▪ LCC-model for bogies and brake systems available ▪ Perspectively further components will be integrated into LCC-model

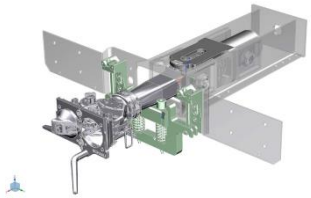
*Automated operational processes, e.g. automated break tests, automated support in technical wagon inspection, support in train integrity, train composition,…

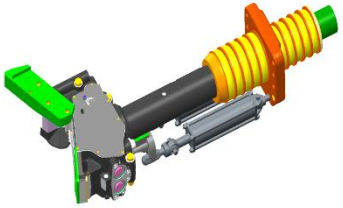
In project „Automated Operational Processes“ innovations shall be identified and migrated on a short and middle term scale

T I S
Zukunftsinitiative 5L

Power Supply Line / Data Bus

Innovative Coupling Systems





Electronic Brake

Digitalisation – new use cases

Adjustment of Rules and Standards

- Identification of rules and standards which restrict the implementation of innovations
- Re-Assessment of suitability of identified rules and standards
- Petition of need for changes through official channels (e.g. associations, committess, …)

Sources: (1) UIC-Kabel aus Wikipedia; (2) Datenbus aus Wikipedia; (3) Automat. Kupplung von Voith, (4) Automat. Kupplung von Faively, (5) Komponenten zur elektronischen Bremssteuerung von Kes GmbH, Sensorik-Schaubilder von DB Cargo AG

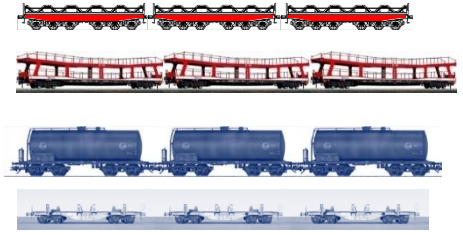
Currently there exist three major innovation projects for rail freight wagons in Central Europe

All 3 projects are implemented by TIS-members

45‘/52‘ Tankcontainer with light intermodal freight wagon

5L-Demonstrator

Innovative Freight Wagon



(symbolic illustration)

Agenda

B **„5L“-Demonstrator Freight Train of SBB Cargo AG / TIS**

Jens-Erik Galdiks
Head of Fleet Technique
SBB Cargo AG

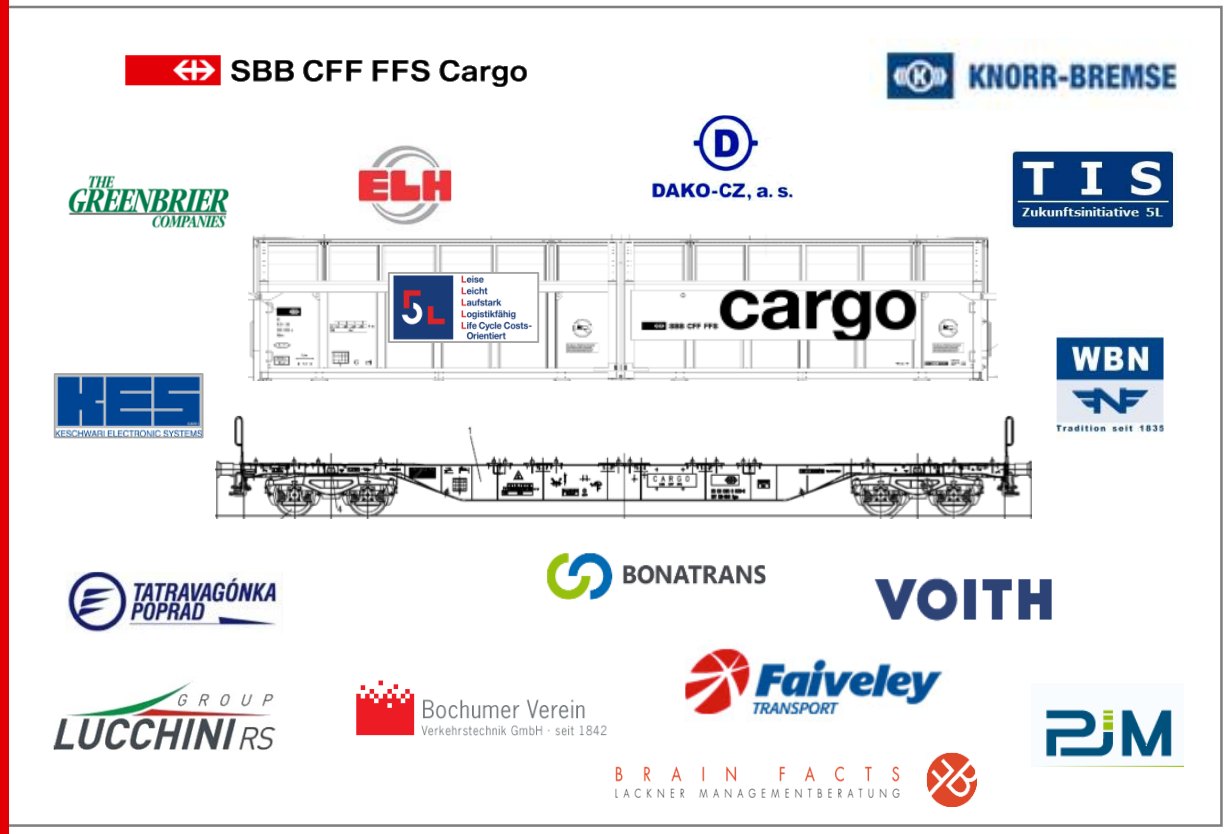
SBB CFF FFS Cargo

The „5L Demonstrator“ is a project supported by numerous actors of the sector in order to test and implement innovative rail freight cars

Forschungsprojekt 5L Demonstrator – Lärmarmer Güterwagen

Vorstellung Projekt

Jürgen Mues /
Jens-Erik Galdiks



The „5L Demonstrator“ is a project supported by numerous actors of the sector in order to test and implement innovative rail freight ´cars

SBB CFF FFS Cargo

TIS Zukunftsinitiative 5L

5L: Leise, Leicht, Laufstark, Logistikfähig, Life Cycle Costs-Orientiert

Introduction of project „5L Demonstrator“

Growth Factors“ 5L“

Low Noise	Significant reduction of noise emissions
Light Weight	Lower net wagon weight means greater payloads
Long-running	Less downtime, fewer outages, greater annual mileage
Logistics enabled	Integrated into supply chains, enhanced service quality
Life Cycle Cost - oriented	Rapid paybacks on invest-ments, savings on operating and maintenance costs

TIS and „Future Initiative 5L“

TIS

- Technical Innovation Circle for Rail Freight Transport (TIS): european practice group for introduction of innovations in freight rail cars
- Objective of Future initiative „5L“: Development and migration of innovative rail freigth cars

Project 5L Demonstrator

Leadership	SBB CFF FFS Cargo
Suppliers	DAKO-CZ, a. s.; VOITH; BONATRANS; Bochumer Verein; ELH; TATRAVAGÓNKA POPRAD; KNORR-BREMSE; WBN; KES; LUCCHINI RS; Faiveley Transport; The Greenbrier Companies
Project management	BRAIN FACTS LACKNER MANAGEMENTBERATUNG
Supported by	Schweizerische Eidgenossenschaft, Confédération suisse, Confederazione Svizzera, Confederaziun svizra

The R&D-project „5L-Demonstrator“ aims at testing of innovative, but already available technologies in real operations

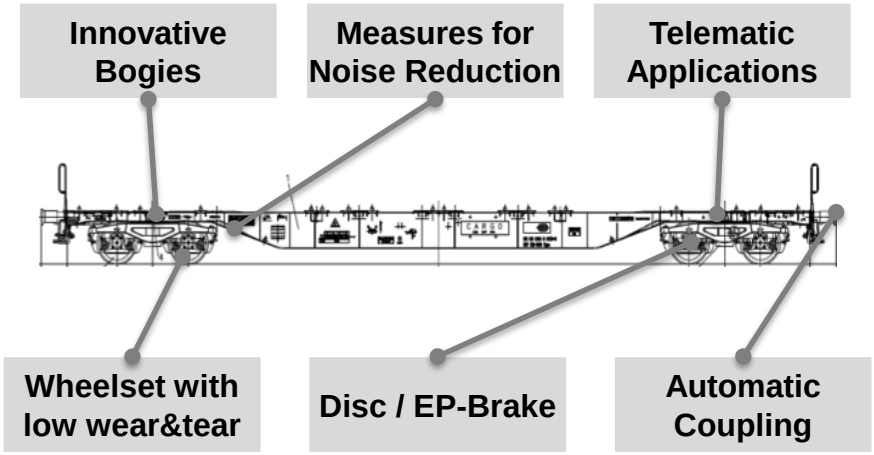
SBB CFF FFS Cargo

TIS Zukunftsinitiative 5L

5L Leise Leicht Laufstark Logistikfähig Life Cycle Costs-Orientiert

Basic idea of the project

Innovative components



Basic idea of the project

1. Test of **innovative components in 4-year long operations (real traffics)**
2. The industry partners supply innovative components for sustainable freight rail cars
3. **Leadership by SBB Cargo**, which takes care about assembly, approval process and operation of „5L“-demonstrator
4. **Reduction of noise emissions by 5 dB to 10 dB** in comparison to conventional rail freight wagon with block brakes (noise remediated)
5. **Operation of the demonstrator trains beginning in 2017,** initially in Switzerland, from middle of 2018 operations aboard is planned

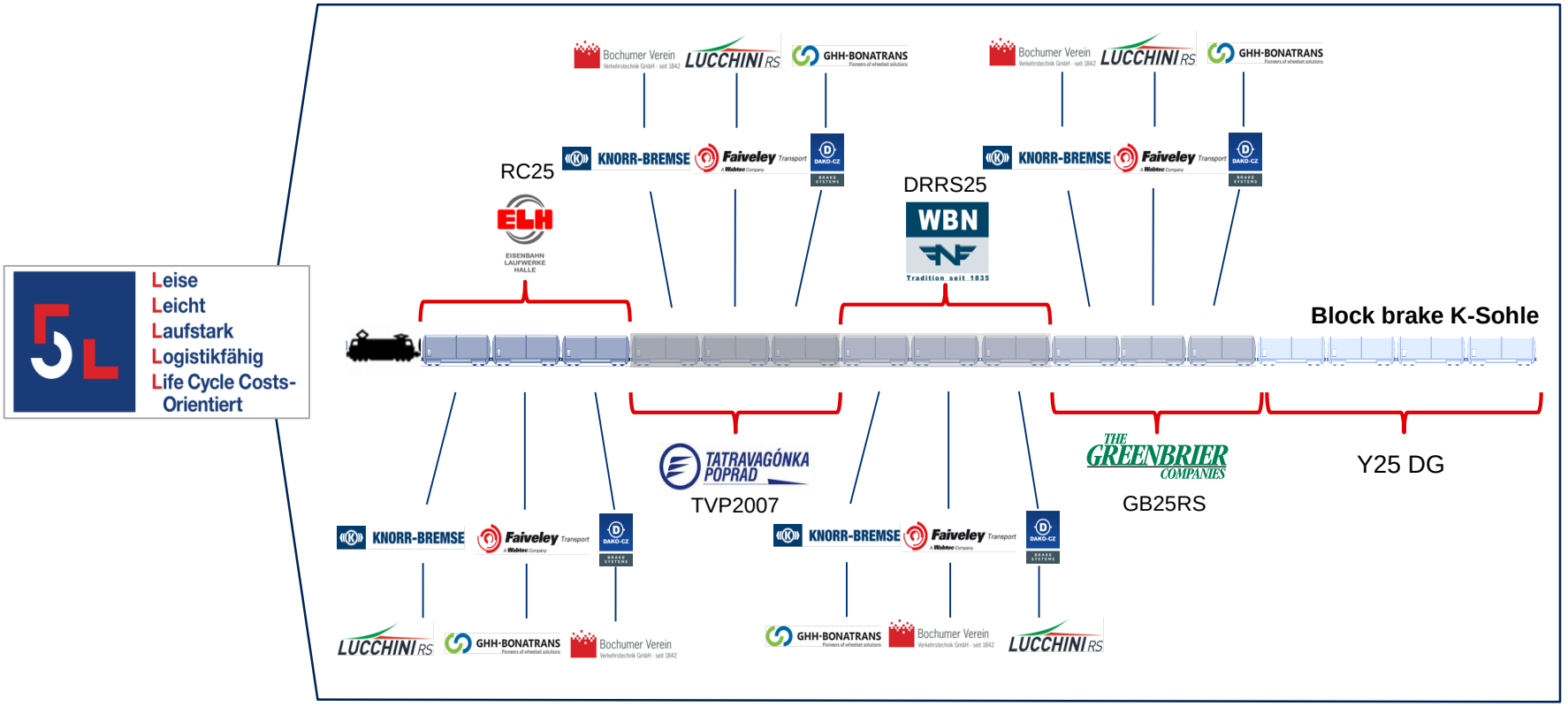
Together with numerous partners of the sector a demonstrator train for operations in customer traffics shall be assembled

SBB CFF FFS Cargo

TIS Zukunftsinitiative 5L

5L Leise Leicht Laufstark Logistikfähig Life Cycle Costs-Orientiert

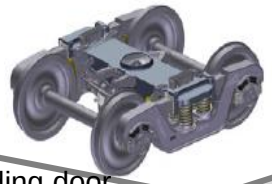
Structure of the demonstrator train



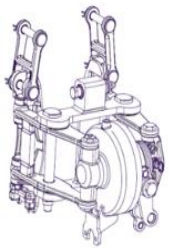
Altogether six different modules will be tested in the 5L-demonstrator in respect to function and characteristics

Components in 5L-demonstrator

Bogies
- Low wear and tear
- Radial steering
- Low noise emissions



Disc Brakes
- Low noise
- Low wear and tear



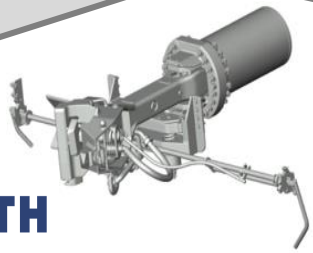
Plattform
- 60’ Container with sliding door
- Isolated / non-isolated
- Further types according to customer requirements

Sgnss SBB Cargo

Intelligence
- Generation and processing of data
- Systems from SP Automation

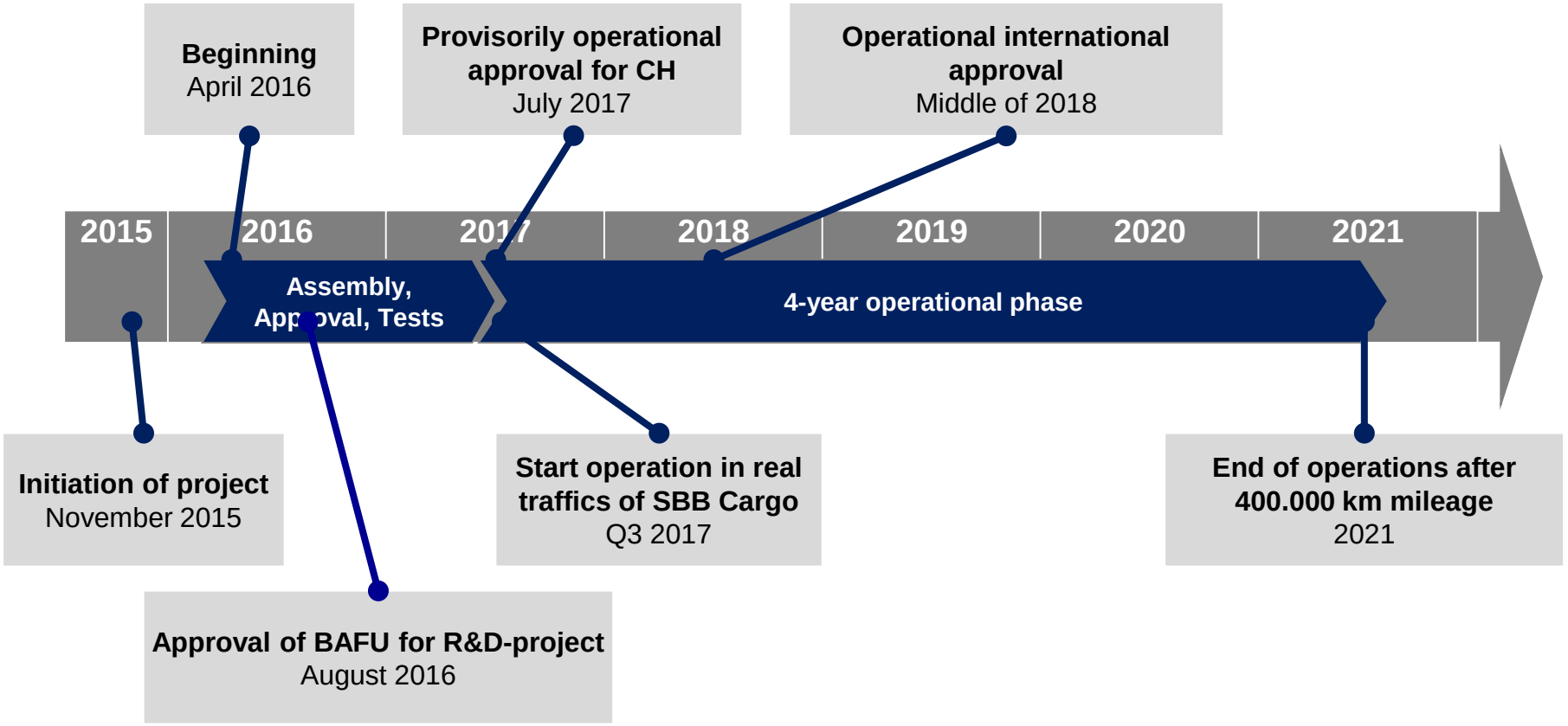
Wheelset
- Low noise
- Low wear&tear

Automatic Coupling
- Optimized production
- Basis for new underframe concepts
- Based on technology used in passenger trains



From Q3/2017 the demonstrator train shall be operational in real customer traffics

Time schedule R&D-project «5L-Demonstrator»



The „5L Demonstrator“ train is only a first step into badly needed innovations for the rail freight sector

Next steps and prospects

Next steps 5L Demonstrator

- **Start of operations** by SBB Cargo beginning from **Q3/2017**
- **Generation and processing of data about condition of innovative components,** identification of further areas for innovations
- **Test of automatic coupling system in real operations in Switzerland**

Prospects

- The sector has to speed up in order to generate **completely new components and wagon designs**
- This integrates amongst others the **use of new materials** (e.g. CFK), the further **implementation of automatised processes as well as the additional use of telematic applications**
- Objective is to **reduce investment costs** for wagons and components as well as the **operational costs** (focus on TCO, investment and Life-Cycle-Costs)

The „5L Demonstrator“ train is only a first step into badly needed innovations for the rail freight sector

1. The „5L Demonstrator“ project is the **first innovation approach of the whole sector** together with numerous actors of the industry

2. The reduction **of noise emissions** by **5dB up to 10dB** in comparison to a block braked freight rail car is a big step and bady needed in order to **sustain the acceptance of the public**

3. The „5L Demonstrator“ can only be **the first step** towards an **innovation-driven improvement process** for the rail freight sector in **order to stay competitive**

4. A **common approach of the sector** is essential in order to **implement innovations** for the rail freight sector

We thank all the participants of the project „5L-Demonstrator“ and wish us all a successful progression of the project!

„5L Demonstrator“ – a common sector approach for the development of a sustainable rail freight car

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Vielen Dank für Ihre Aufmerksamkeit!

Gibt es noch Fragen?

Agenda

C **Industry platform telematics and sensors in the rail freight sector**

René Höpfner
Project Rail Transport

BOSCH
Technik fürs Leben

Agenda

1 Introduction

- 1. Our motivation
- 2. Our principles
- 3. Who we are

2 Proceedings at ITSS

- 1. Interface 1
- 2. Interface 2

3 Q & A

Motivation of the practice group ITSS

initiated

- Compatibility of telematic units and sensors of different suppliers was not guaranteed as there has been no standardization of data exchange.

- Only with a common standard for the different interfaces of telematics and sensor technology devices of different suppliers can communicate with each other and a widely spread migration into the European wagon fleet seems possible.

- Initiated by dialogue between the TIS-group and various suppliers of telematics and sensor technology a industry platform for telematics and sensor technology (ITSS) has been founded.

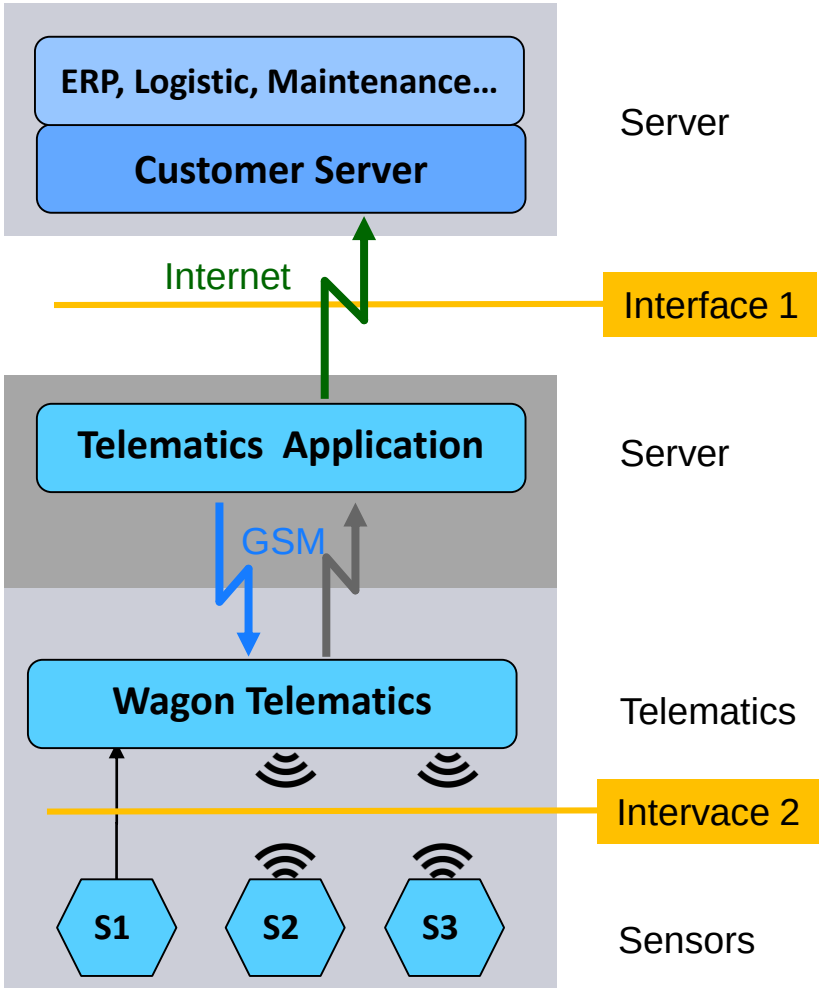
Principles of the practice group ITSS

ITSS interface standardizations are …

- the interest of the owner and operator of the rail freight car is in the focus
- Supports multi vendor strategy
- Easy to implement for providers and users
- Common and open and freely available
- Provider neutral and non restrictive
- Propriety extensions possible
- Applicable in Europe / worldwide

1. Who are we …

Proceedings at ITSS



ITSS interface #1
Data exchange between server of telematics application and ERP-systems of customer

ITSS interface #2
Data exchange between telematics device on board and sensors, which are fixed to the transport unit

Proceedings at ITSS: ITSS-Interface1

- Principles?
  - ITSS-Interface1 is the standardized communication between backend systems of the telematics provider and the customer using JSON REST
  - allows to use telematics devices from different vendors
- What is new to ITSS-Interface1 V1.1?
  - Push notifications & Consistent usage of HTTPS (encryption for security)
  - Loading State added, and many minor changes and corrections
- What is next?
  - ITSS-Interface1 V1.2 : remote configuration & status of device (e.g. battery, …)
  - Go Live approximately second half of 2017

Go Live of ITSS-Interface1 V1.1 is now! Download here:

Proceedings at ITSS: ITSS-Interface2

- Principles:
  - ITSS-Interface2 is the standardized wireless communication between sensors and telematics devices using IEEE 802.15.4 2,4GHz
  - allows to use sensors and telematics devices from different vendors
- Status:
  - The ITSS-Interface2 is not yet finalized, but it is already possible to build telematics devices and sensors that can be updated to comply with the standard as soon as it is finalized.
- Obligation for using the ***ITSS-Interface2-Ready*** logo:
  - telematics devices and wireless sensors if they use IEEE 802.15.4 2.4 GHz compatible transceivers for communication and if their firmware can be updated
  - the ITSS practice group is informed about the intended use

Want to become a member?
Questions? Contributions?

ITSS practice group

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Industrieplattform Telematik und Sensorik im Schienengüterverkehr (ITSS)

Industry platform telematics and sensors in the rail freight sector

Thank you for your interest!

Agenda

D **Conclusion and Prospects**

Jürgen Hüllen
Consultant
Spokesman of TIS

VTG

Conclusion

- During the **last two years TIS has defined technical, operational and economical requirements** for innovative components like **bogies, wheelsets, disc brakes, telematics and sensor technology as well as innovative coupling systems**. These requirements have been discussed and evaluated with the suppliers.

- **In 2016 TIS has entered a new stage of activities**. In the “5L”-project of SBB Cargo AG supported by TIS innovative technologies are tested in a demonstrator train which will be in action by summer 2017.

- In the field **of telematics and sensor technology TIS** together with a **group of suppliers (ITSS) establish standards for data exchange**. A first specification for the interface between the application servers of the suppliers and the servers of the users (e.g. ERP-systems) is published today. The specification for a second interface for data exchange between sensors and telematics units of different suppliers is in development and will be published in 2017.

Prospects

- TIS has shown a lot of **activities in innovations for rail freight wagons**. Many of those innovations are going to be tested in the **demonstrator train of SBB Cargo AG/ TIS.** Furthermore TIS will of course continue to enable migration of innovative technologies in rail freight wagons.
- Nevertheless TIS stands for Innovation Circle for Rail Freight Transport and not only for innovations in rail cars. Therefore TIS has decided to **broaden their scope** into more operational topics and has initiated a **new working group "Automated operational processes"**. Scope is to reduce the efforts for technical train inspections as well as for other operational processes e.g. automated break test, detection of train composition.
- TIS is willing to **actively develop further innovation topics**. As there exist various ideas and topics for innovations in rail freight traffic and ressources of the TIS-participants are limited, **TIS is seeking for support**. **New participants - also from other countries besides Germany/Switzerland - are cordially welcome**. Participants of TIS should be either shippers, forwarding companies, wagon keepers, railway undertakings or railway infrastructure undertakings, suppliers of the railway industry.

Thank you very much for your attention.

For further information about TIS please view our homepage:
www.innovative-freight-wagon.eu

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