<Innovation and Digitalization in the Railways Cargo Field>
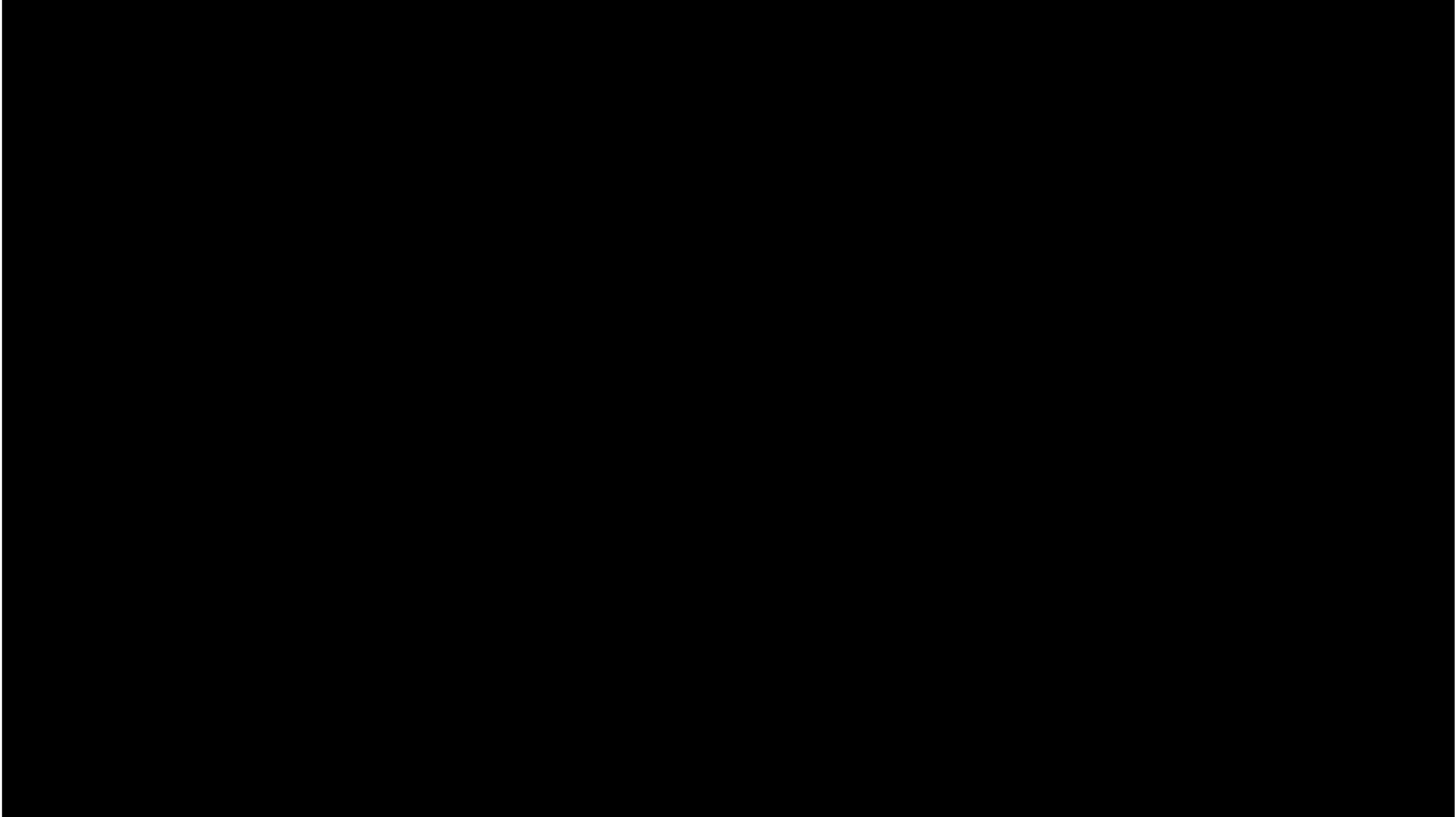
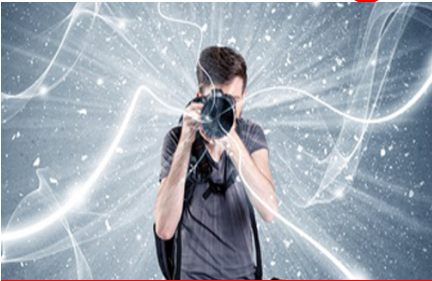Jens-Erik Galdiks, Head of Rolling Stock Technology, SBB Cargo AG

We shape the mobility of the future – simple, personal, networked.

Digitalization enables a significant improvement of working methods towards our customers, within production and asset management

SBB CFF FFS Cargo

Wayside Intelligence

Check-In per RFID

Diagnostics

Predictive Maintenance

Maintenance Control Center

Asset Intelligence

User Interface

Network Intelligence
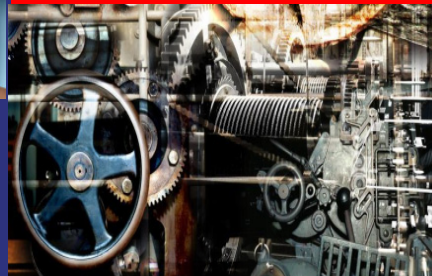
The freight railway system has big potential for innovation but only by implementing substantial changes

Status quo	Effect
• Long and strong History of Railway • Interchangeability • National specifics • High cost pressure in the logistic market • Weak financial position of Cargo Rus • Strong national players with specific interests • Long Lifecycle of rail assets • ….	• Backlog of Innovation • No courage for major changes due to the issue of compatibility in Europe => standardization trap • Basics and Enabler technology is not introduced (e.g automatic coupler / asset intelligence / energy on freight cars) • Little interest in innovation in the sector • A lot of manual processes and nearly no automation • Little use of existing information and data • Still nearly no intelligence in freight assets • ….

Focus must be a higher customer value with parallel reducing the costs in the railway system
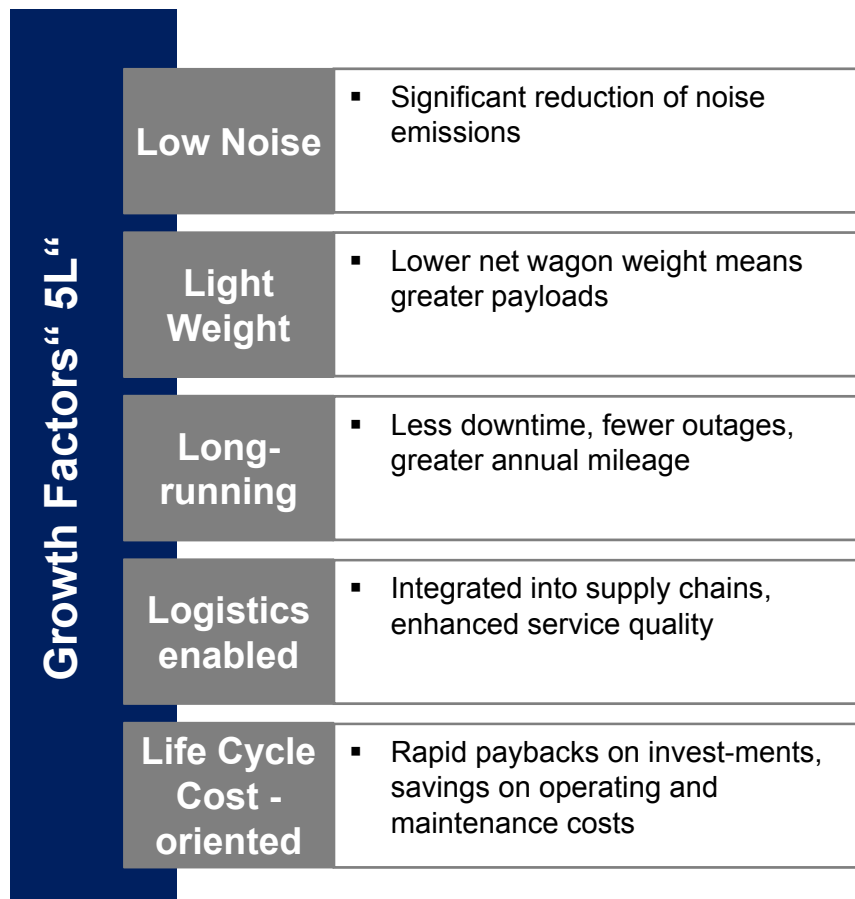
5L Demonstrator Train

The „5L Demonstrator" is a project supported by numerous actors of the sector in order to test and implement innovative components

Introduction of project „5L Demonstrator"

Growth Factors" 5L"

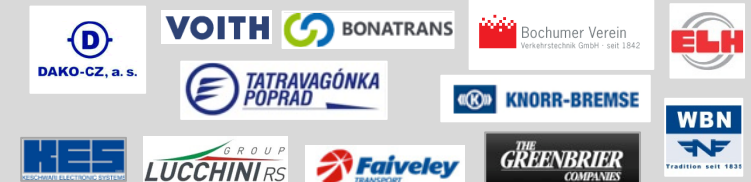|	
Low Noise	▪ Significant reduction of noise emissions
Light Weight	▪ Lower net wagon weight means greater payloads
Long-running	▪ Less downtime, fewer outages, greater annual mileage
Logistics enabled	▪ Integrated into supply chains, enhanced service quality
Life Cycle Cost - oriented	▪ Rapid paybacks 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 freight cars
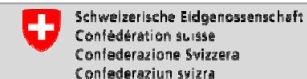
Project 5L Demonstrator

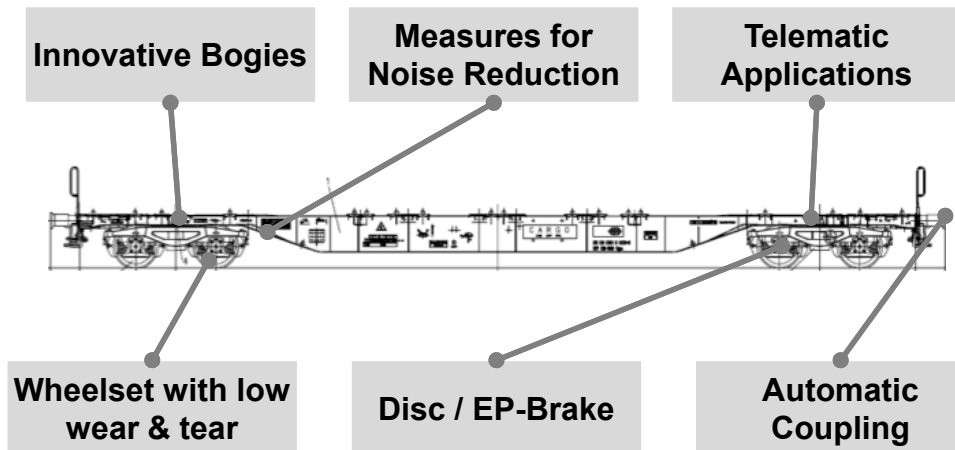|	
Leadership	SBB CFF FFS Cargo
Suppliers	DAKO-CZ, a. s. · VOITH · BONATRANS · Bochumer Verein · ELH · TATRAVAGÓNKA POPRAD · KNORR-BREMSE · WBN · KES · LUCCHINI RS GROUP · Faiveley TRANSPORT · THE GREENBRIER COMPANIES
Project management	BRAIN FACTS LACKNER MANAGEMENTBERATUNG
Supported by	Schweizerische 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 – starting in 2017

Innovative components

Innovative Bogies	Measures for Noise Reduction	Telematic Applications

Wheelset with low wear & tear	Disc / EP-Brake	Automatic Coupling

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)
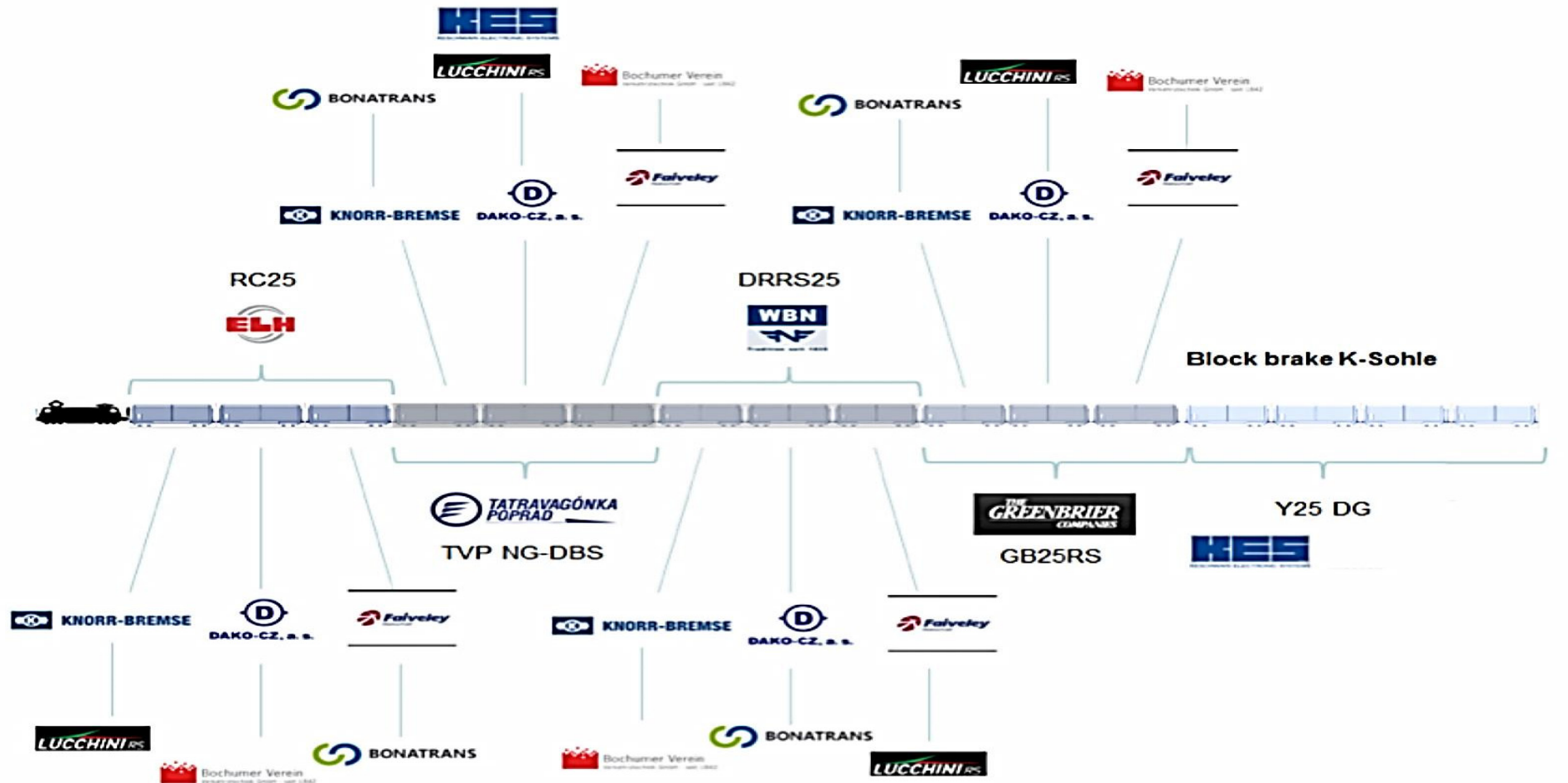
5 **Operation of the demonstrator trains beginning in 2017,** initially in Switzerland, from middle of 2018 operations in Europe is planned

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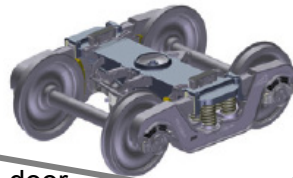
Structure of the demonstrator train

Total 6 systems / modules are checked on their functions and properties during the real operation of the 5L demonstrator
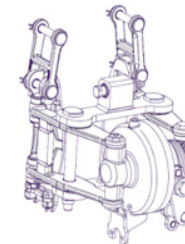
Komponenten im Testbetrieb

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
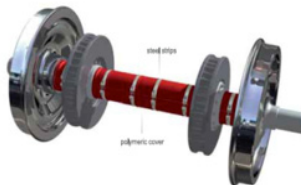- Further types according to customer requirements

Sgnss SBB Cargo

Intelligence
- Generation and processing of data
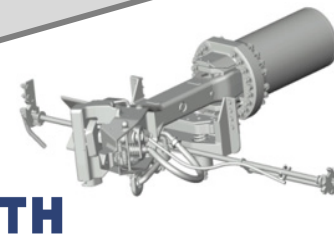- Asset Intelligence Systems
- Condition Monitoring

Wheelset
- Low noise
- Low wear&tear

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

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

Focus: **reduce investment costs as well as operational costs / implementation of automatised processes and additional use of telematic applications / Usage of new designs, materials and components**

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

Automation and Asset Intelligence

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Automation technology has the potential for a significant productivity boost

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Production	Customer	Maintenance

| Asset Intelligence	Wayside Technology	Mobile Devices	Automatic Coupling	Automatic Brake Test	Autonomous Driving in Shunting

Increase of Competitiveness is an important driver for innovation in train formation and shunting

Value
- Punctuality
- Reliability of planning
- Operational Safety
- Attractive pricing
- Flexibility
- Availability of rolling stock
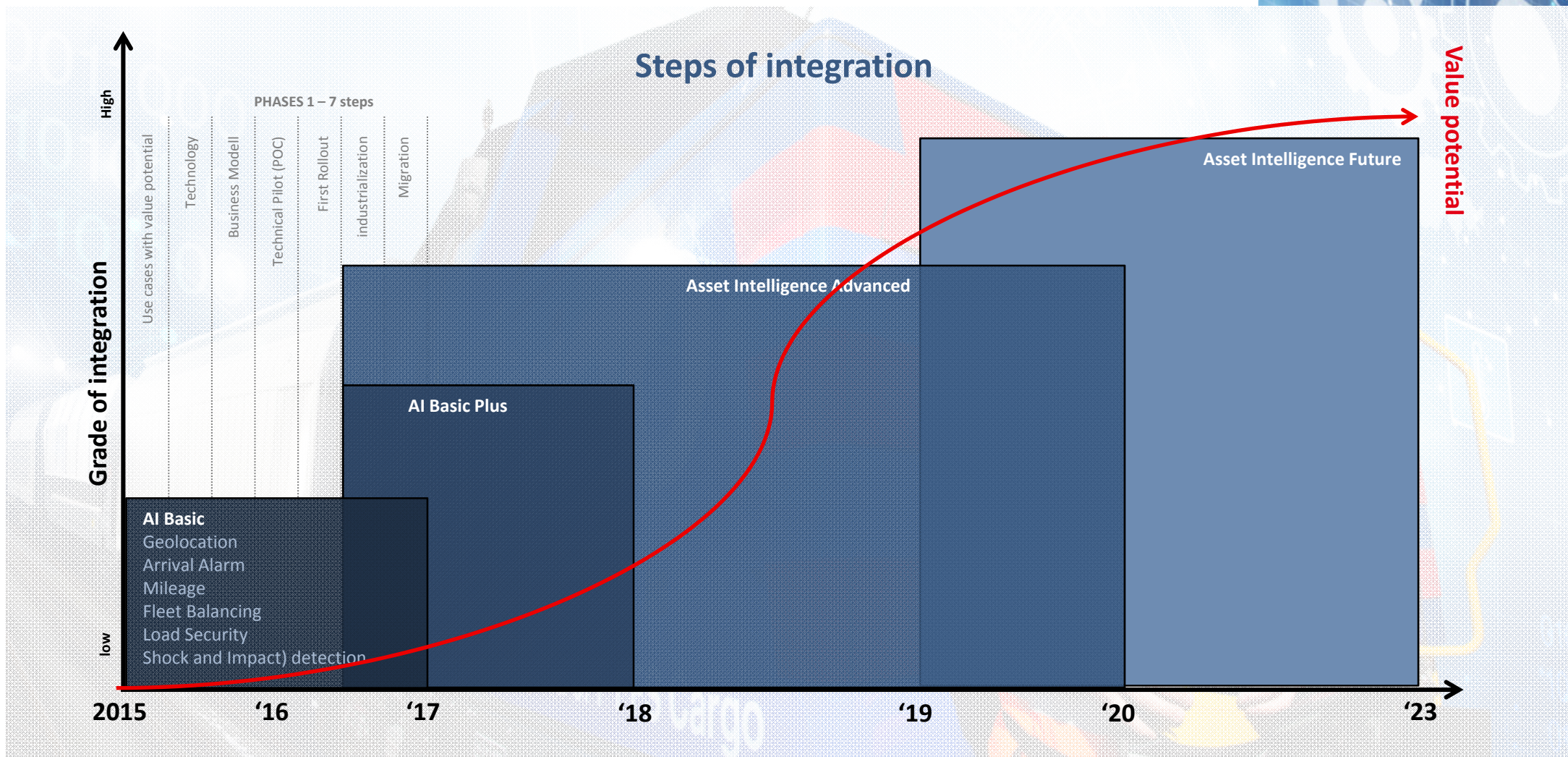- Attractive job profiles
- Energy consumption
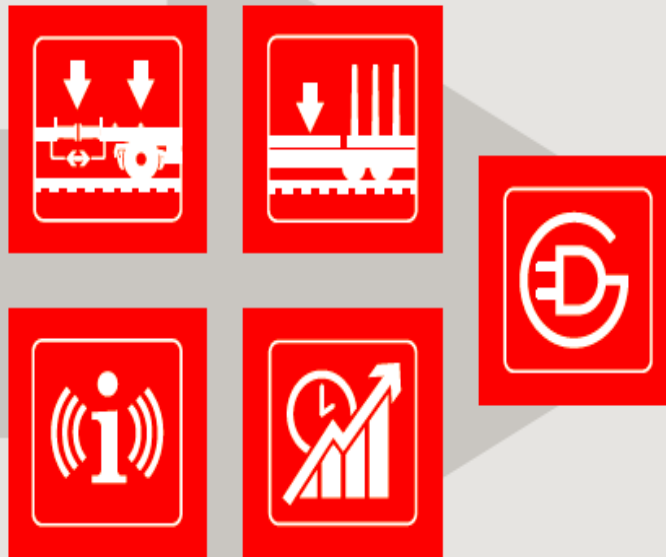
Concepts
- Semiautomatic Shunting
- Automatic Coupler
- Last Mile Traction
- Wayside Intelligence
- Automatic braking test
- Digitalization & Processes
- Intelligent Wagon
- New concept for train checks

Asset Intelligence is the basis for an automated train preparation and less human driven processes

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Steps of integration

Value potential

Grade of integration

High

low

PHASES 1 – 7 steps

Use cases with value potential
Technology
Business Modell
Technical Pilot (POC)
First Rollout
industrialization
Migration

Asset Intelligence Future

Asset Intelligence Advanced

AI Basic Plus

AI Basic
Geolocation
Arrival Alarm
Mileage
Fleet Balancing
Load Security
Shock and Impact) detection

2015 '16 '17 '18 '19 '20 '23

Two systems for optimum efficiency in the field of customer and rail production
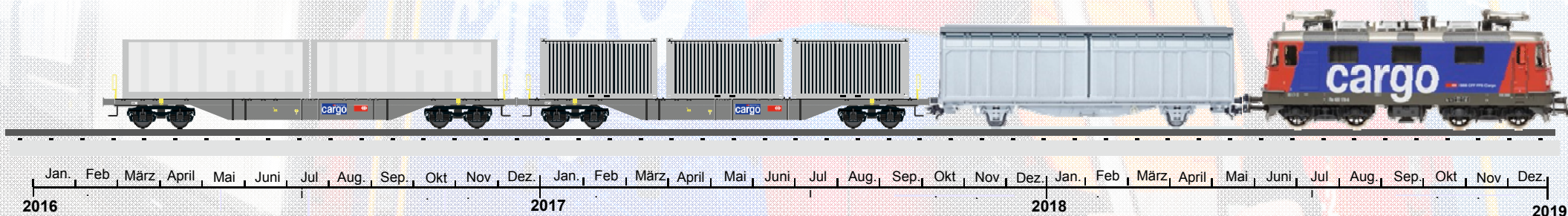

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Focus Customer

> Arrival alarm-/ forecast
> Geolocation
> Transport Monitoring
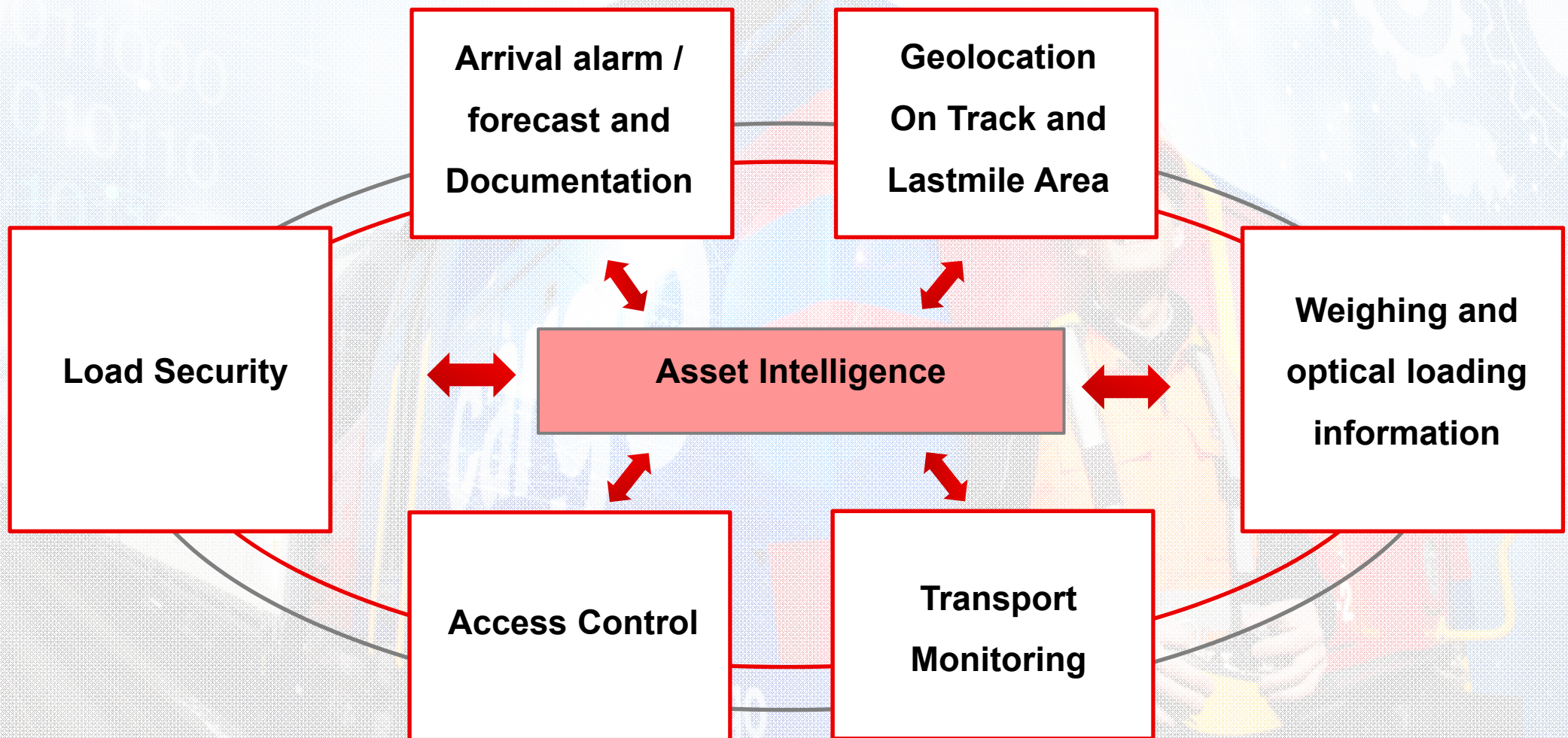> Access control
> Load security
> Wagon identification (RFID)

Jan. Feb März April Mai Juni Jul Aug. Sep. Okt Nov Dez. | Jan. Feb März April Mai Juni Jul Aug. Sep. Okt Nov Dez.
2016 — **2017** — **2018**

Focus Production

Jan. Feb März April Mai Juni Jul Aug. Sep. Okt Nov Dez. | Jan. Feb März April Mai Juni Jul Aug. Sep. Okt Nov Dez. | Jan. Feb März April Mai Juni Jul Aug. Sep. Okt Nov Dez.
2016 — **2017** — **2018** — **2019**

> **Automatic Break Test**
> **Train integrity – waggon sorting**

> **Load recognition and weighing**
> **Load security**

> **Derailment detections**
> **Enabler Condition Based Monitoring & Maintenance**

Thank you

SBB CFF FFS Cargo