



# Horizon 2020 call: openETCS@ITEA2 proposal

## MG.2.3 – 2014: New generation of rail vehicles

supported by:



Federal Ministry  
of Education  
and Research



Région de  
Bruxelles-  
Capitale



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE CIENCIA  
E INNOVACIÓN

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openETCS@ITEA2 Project

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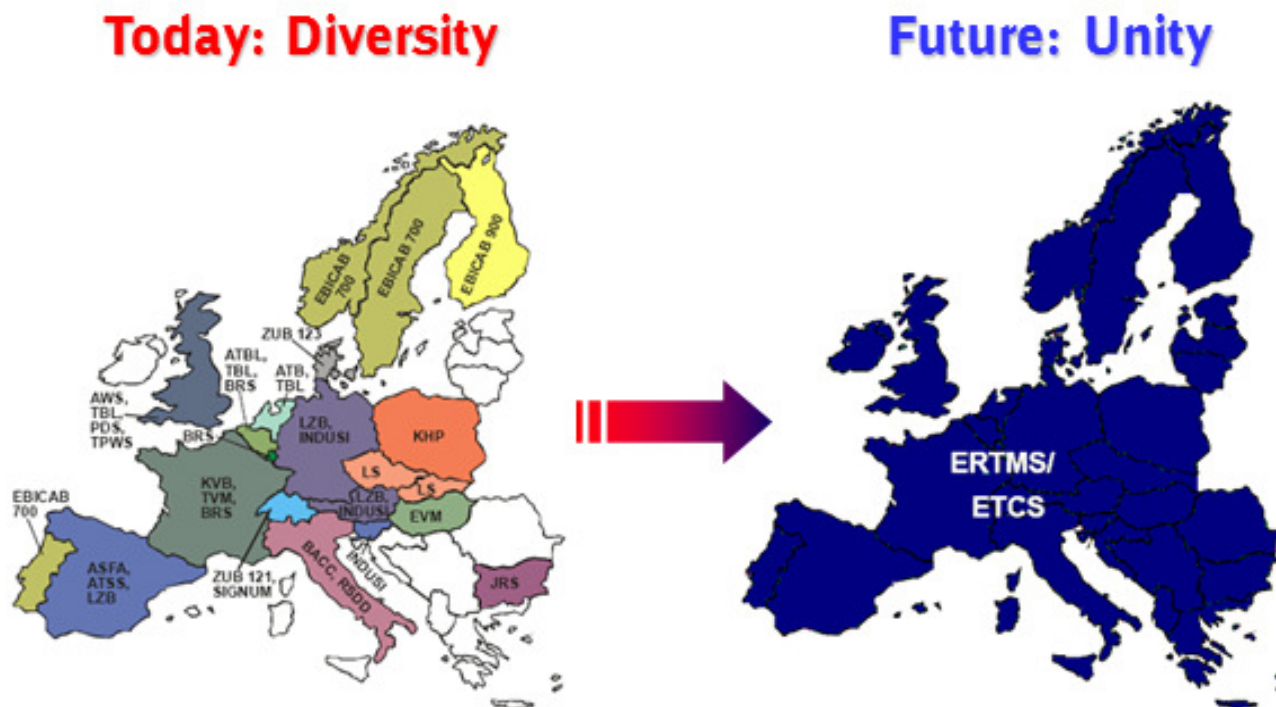
Baseliyos Jacob, DB Netz AG

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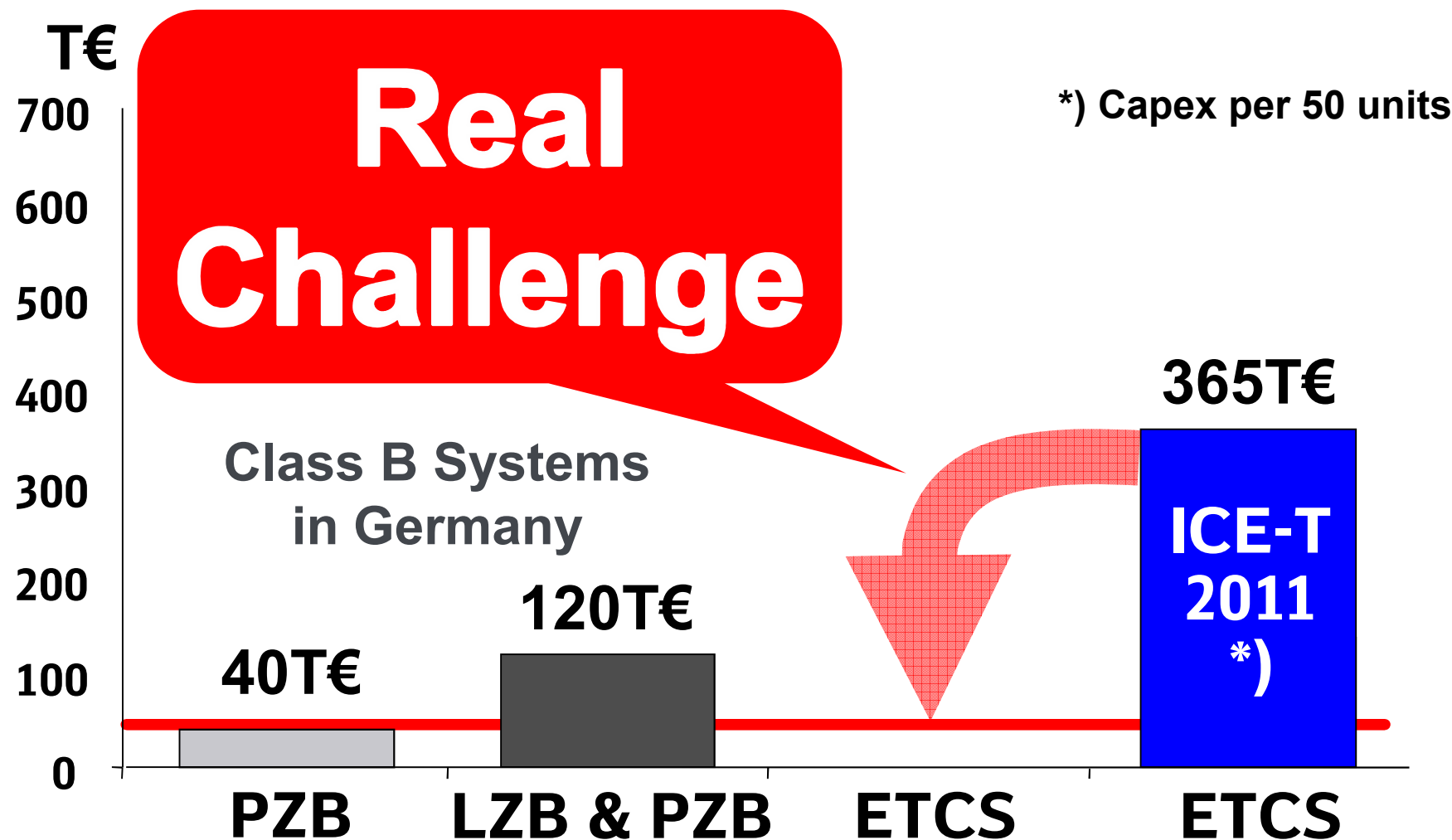
Munich, 16.01.2014

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- Reduced life cycle costs
- Formalization for certification (CENELEC)
- Improved interoperability for seamless operation



# OBU Capex: legacy PZB vs. ETCS



# What is “openETCS”?

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- |                              |   |                             |
|------------------------------|---|-----------------------------|
| <b>Reduce complexity</b>     | → | <b>1. Standardization</b>   |
| <b>Reduce ambiguities</b>    | → | <b>2. Make it “formal”</b>  |
| <b>Avoid “bug” surprises</b> | → | <b>3. Life-time service</b> |
| <b>No vendor lock-in</b>     | → | <b>4. “Open proofs”</b>     |

# openETCS @ ITEA2 Project



**Funded by:**



MINISTÈRE DE  
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LA RECHERCHE

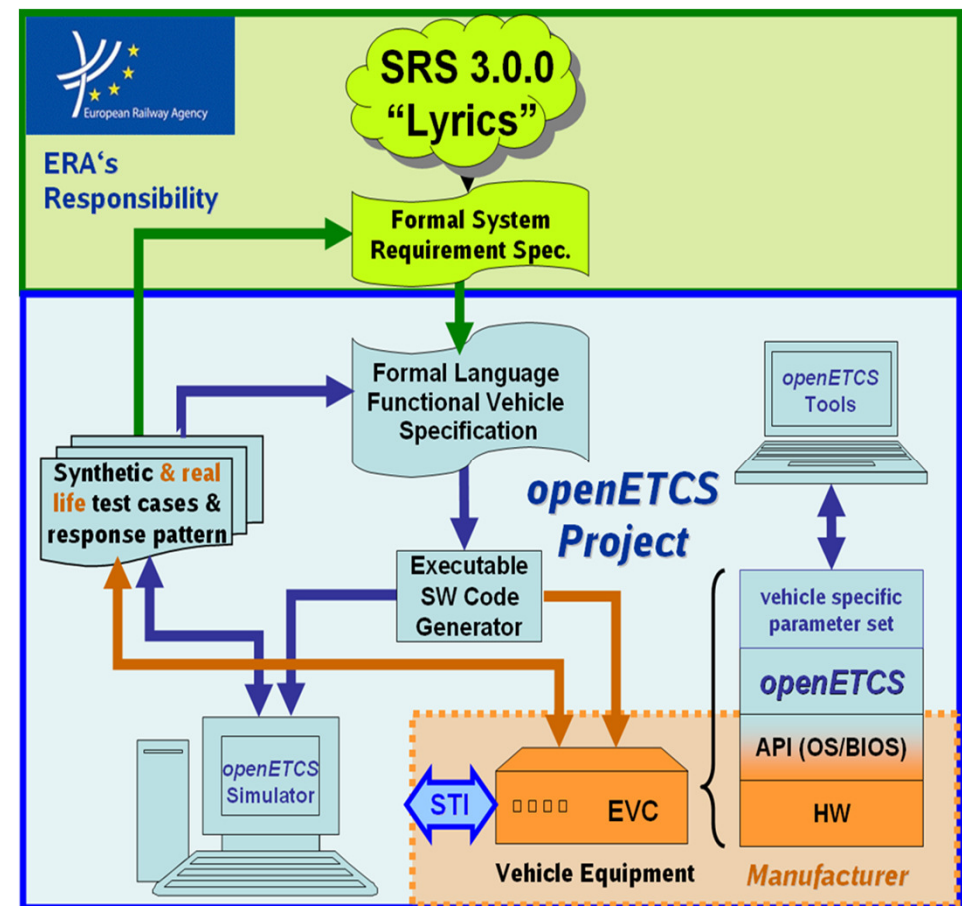


## openETCS

Programcall	ITEA 2 Call 6 11025
Title	Open Proofs Methodology for the European Train Control Onboard System
Period	Jul 2012 - Jun 2015
Status	Labelled
Domain	Services, Systems & Software Creation
Technology	Engineering and development
Effort	156 man-year
Costs	18,959,000 EURO

# openETCS Expected Results

- **Open formal specification**
  - taking out uncertainties
  - true interoperability
- **Open on-board reference unit**
  - standardized hardware interfaces
  - standardized unified software
  - open modularity
- **Open tool chain**
  - open up software service market
  - transparent approval process
  - increased productivity





- **Strong commitments by end users are essential**
  - end users need to be the „drivers“ if „user-friendliness“ is expected
- **Early vision and mission definition**
- **Formalization of processes and procedures**
- **Strict communication rules**
  - keep yourself short
  - communicate regularly

# Objectives for an openETCS Follow-UP@Horizon2020

## Enhanced functionality

- integration of “openSTM” 
- on-board unit interfaces

## Establishing new business models

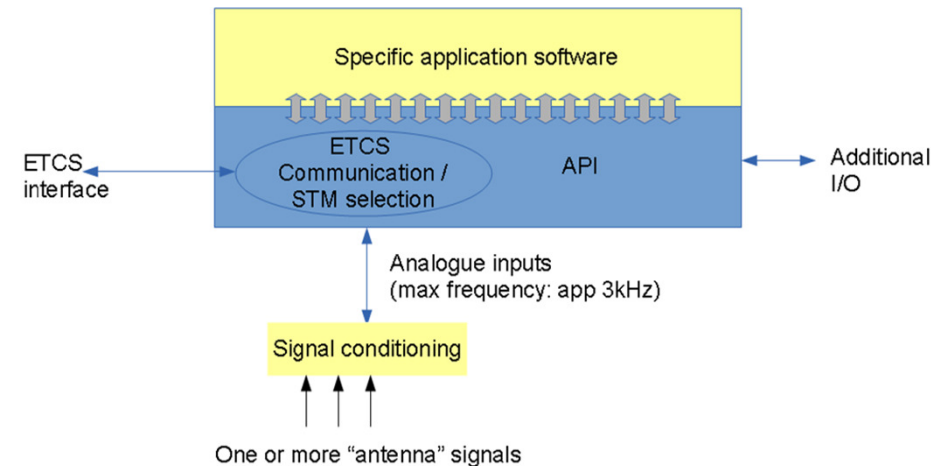
- software as a service
- greater level of competition

## Very long term support

- > 30 years software service (ETCS+STM)
- obsolescence management

## Security for critical infrastructure software

### Development of the generic part of the STM





# openETCS OBU Level 0,1LS,2,3,STM

## & openSTM

~~PID: Proprietary  
Interface Definition~~

~~FIS: Functional  
Interface Specification~~

FFFIS: Form Fits  
Function Interface Spec.

Open Sub  
System

STM

Class B  
FFFIS



Train Control  
System

FFFIS

TIU

Train  
Integrity

FFFIS

FFFIS

BTM

FFFIS



Driver

FFFIS

DMI

FFFIS

EVC

FFFIS

FFFIS

LTM

FFFIS



ETCS  
OBU

FFFIS

JRU  
Download

FFFIS

JRU

Odometer

FFFIS

Euroradio

FFFIS

GSM-R  
Mobile

GSM-R  
Network



# Expected Benefits Follow UP@Horizon2020



- **Improved performance**
  - ERTMS regional
  - improved diagnosis by using formal models
- **Interoperability**
- **Less homologation**
- **Option for Energy Saving**
  - automatic train operation

# Expected Benefits

## Follow-UP@Horizon2020

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- Enhance security for software
- Enhance safety, reliability and quality
- Reduced lifecycle cost
- No vendor lock-in

# Socio-Economic Goals

## Follow UP project@Horizon2020



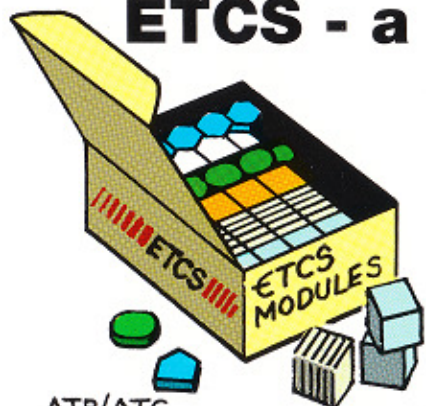
- **Support migration strategy of ERTMS**
- **Promotion and acceleration of innovation development**
- **Adaption of the innovations into the european railway market**
- **Reinforce the european railway market**
- **Increase passenger and freight train capacity**
- **Economies of scales**

# Original Driving factors for ERTMS



- **Possibility of procurement under competition**
- **Technical and operational interoperability**
- **Adequate safety, reliability and quality of service for train operators**
- **Increase of transport capacity**
- **Reduction of life cycle costs**

# ETCS - a building block system ...



The large functional flexibility which is required necessitates the modular design of ETCS hardware and software.

**From UIC/ERRI A200  
August 1993**

ATP/ATC  
DRIVER  
INTERFACE

ETCS  
PROCESSOR

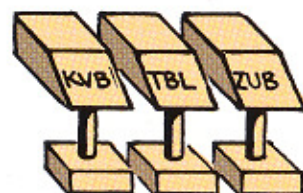
ODOMETER,  
ROUTE MAP,  
RECORDING UNIT,  
ETC.

INTERFACES

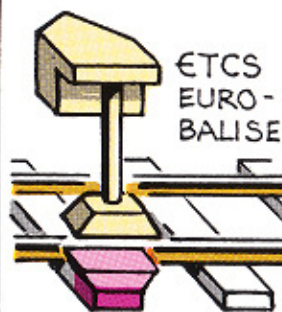
ETCS BUS

LZB

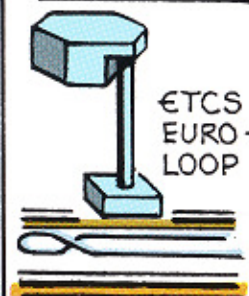
TVM



ANTENNAS FOR  
EXISTING SYSTEMS  
(OPTIONAL)



ETCS  
EURO-  
BALISE

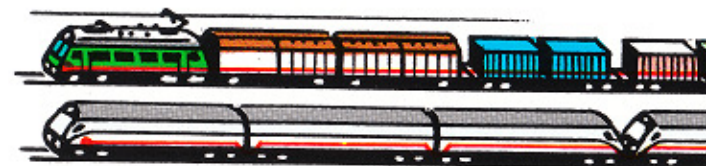


ETCS  
EURO-  
LOOP

GSM

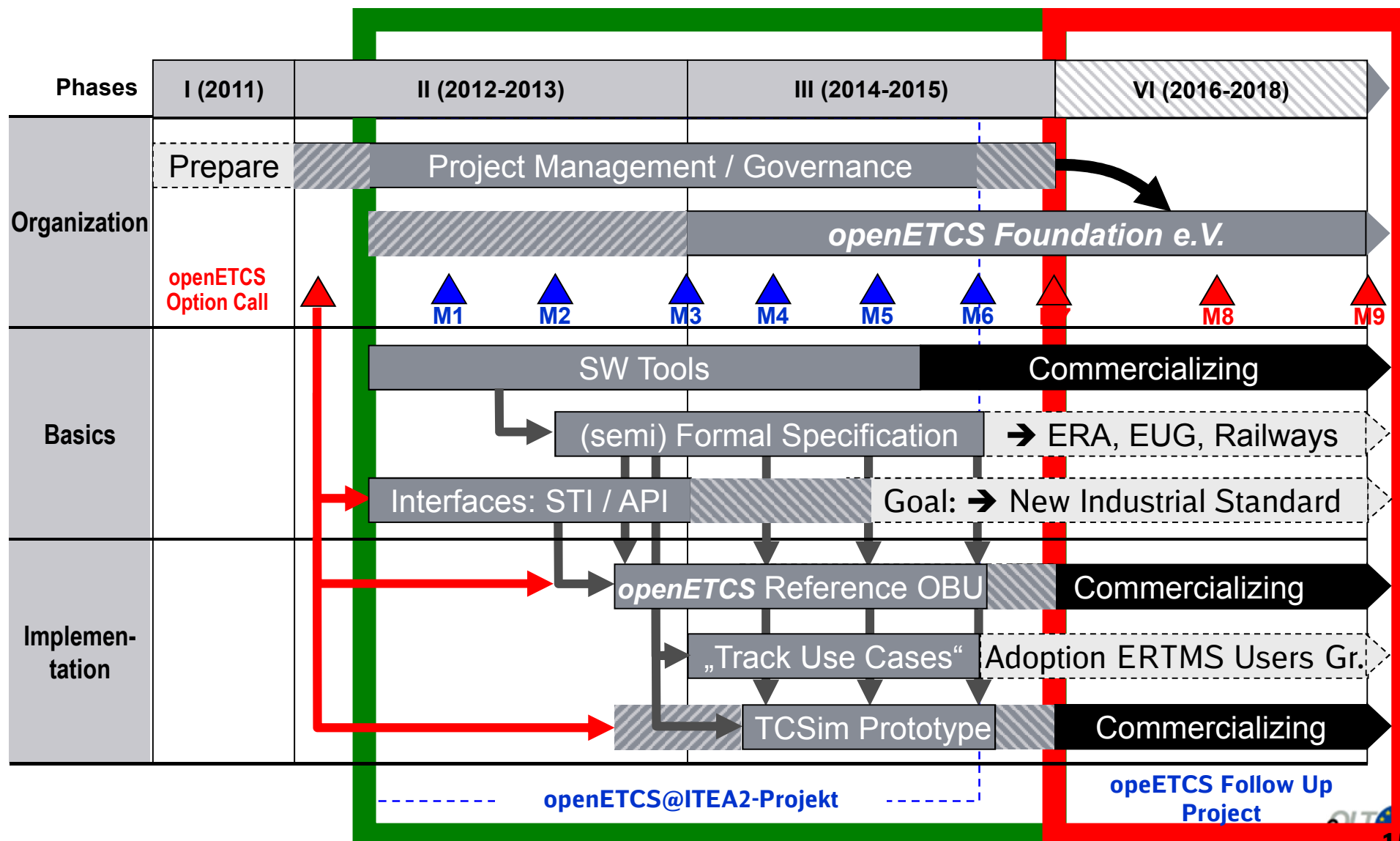


ETCS  
EURO-  
RADIO





# openETCS Project Schedule Overview



# Time-line of proposed Follow-Up projects

12/2016 ICE-T Baseline 3  
open source SW

**3,5 Years \*) 06/2015**

openETCS@ITEA2

2017-2025: Migration from  
proprietary to open source

**2 Years**

**12/2017**

Follow-up@Horizon2020

**~7 Years**

Follow-up@Shift2Rail

**>10 Years**

Business model for  
very-long-term-support

**\*) Including intended extension by 6 month**

**06/2017**

# Next steps

- Draft of a proposal with the openETCS partners before end of January
- 1st open proposal workshop@University of Brunswick 11.02.2014  
[www.openetcs.org](http://www.openetcs.org) – Upcoming Events, 1 pm – 6 pm (CET)
- 2nd open proposal workshop@Brussel (CER/UIC) 18.02.2014  
[www.openetcs.org](http://www.openetcs.org) – Upcoming Events, 1 pm – 6 pm (CET)
- Final proposal until 15.03.2014 for the 1st step
- Partners who want to participate please send a one page proposal with budget, tasks and expertise before end of February
- Please send your proposal to: [Horizon2020@openetcs.org](mailto:Horizon2020@openetcs.org) and in copy to [baseliyos.jacob@deutschebahn.com](mailto:baseliyos.jacob@deutschebahn.com)

# Who do we look for?

- **ERTMS signalling experts (industry, universities, R&D, engineering consultants)**
- **Class B signalling experts for openSTM (industry, universities, R&D, engineering consultants)**
- **System experts (ERTMS OBU)**
- **Modelling experts (R&D, universities, industry, ...)**
- **Experts in the area of process definition and integration**
- **Railway undertakings**
- **Railway infrastructure managers**
- **V&V experts (CENELEC, ...)**
- **Experts for transport (suburban and urban area, metro, high-speed, freight)**
- **Notified Body/Safety**

## Next Events

Please visit us:



**[www.openetcs.org](http://www.openetcs.org)**

## **@Upcoming Events**

1st open proposal workshop@University of Brunswick 11.02.2014 –  
[www.openetcs.org](http://www.openetcs.org) – Upcoming Events

2nd open proposal workshop@Brussel (CER/UIC)18.02.2014  
[www.openetcs.org](http://www.openetcs.org) – Upcoming Events

Please confirm your participation to one of the events: [Horizon2020@openetcs.org](mailto:Horizon2020@openetcs.org)

**We appreciate every further proposal@the workshop!!**

Please send us your proposal to: [Horizon2020@openetcs.org](mailto:Horizon2020@openetcs.org) and in copy  
[baseliyos.jacob@deutschebahn.com](mailto:baseliyos.jacob@deutschebahn.com)

# Location and time @Upcoming Events

**1st open proposal workshop@University of Brunswick 11.02.2014,  
1pm - 6 pm (CET)**

**[www.openetcs.org](http://www.openetcs.org) – Upcoming Events**

**@University of Brunswick, Germany, Pockelstraße 4,  
Room: Neuer Senat Sitzungssaal 1st Floor**

**2nd open proposal workshop@Brussel (CER/UIC)18.02.2014,  
1 pm – 6 pm (CET)**

**[www.openetcs.org](http://www.openetcs.org) – Upcoming Events**

**@Brussels, Belgium, UIC/CER,  
53 Avenue des Arts, Room: 1st Floor**



# Questions

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# Thank you very much for your attention

# Backup

# Horizon 2020 Funding



**Total funding for the Rail Part 2014-2015 52 Mio. €**

**Total funding for MG 2.3 „New generation of rail vehicles“ 14-16 Mio. €**

## **2 Step proposal:**

### **1st stage:**

- Limited criteria
- Submission deadline: 18.03
- Successful proposals are invited to submit a complete proposal

### **2nd stage:**

- Evaluated against all 3 criteria (Excellence, implementation, and impact)

# Horizon 2020 Funding

**Rail related topics are o.k. including under the followed category „Research & Innovation Actions“**

## **Funding:**

- 100% for direct project costs
- 25% for indirect project costs
- No difference between R&D, SME, Academics, Industry
- All EU member are eligible to get a funding

## MG 2.3 – 2014 „New generation of rail vehicles“



**Specific challenge:** *A combination of rail customers' ever-evolving requirements for ..... notably imposing the delivery of enhanced functionality, comfort, safety, operational performance, interoperability and reduced life cycle costs. Reconciling such requirements will imply a departure from the traditional, incremental approach to vehicle development to a whole new way of thinking on product development.*

**Scope:** *Proposals should focus on innovative system approaches leading in the longer-term to the development and demonstration of a new-generation of railway vehicles and passenger trains, characterised by significant improvements in product reliability, cost-effectiveness, .... safety and security, environmental impacts, ease of manufacture and interoperability. This will demand not only the development and integration of higherperformance technologies for critical structural components and traction, command-control and cabin environment applications.... (e.g. modular, "commercial off-theshelf" or adaptive concepts) that best contribute to the lean manufacturing and more efficient and safe operation of such vehicles. Proposals should also consider the development of innovative solutions to extend vehicle lifetime, or simplify retrofitting and will ensure interoperability...*



## MG 2.3 – 2014 „New generation of rail vehicles“



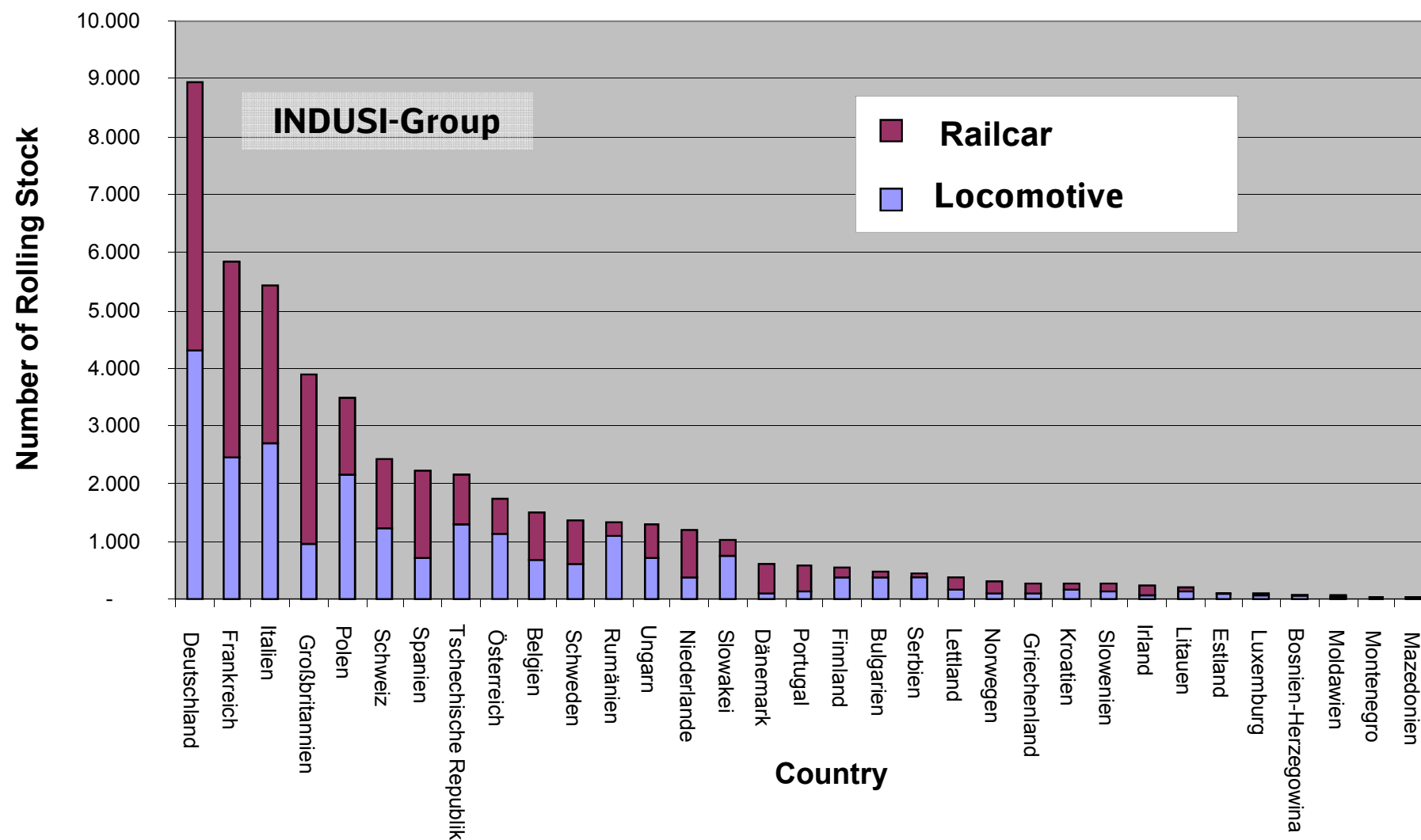
**Scope:** *Attention should also be paid to the development of innovative, modular and customizable solutions for comfortable and attractive train interiors as an integral part of the whole passenger train concept. In particular, these should .... As well as other on-board ...*

**Expected impact:** The key goal will be to deliver a reduction of up to 40% in life cycle costs of rolling stock products, an increase in passenger train capacity up to 15%, reductions of downtime by increased reliability (up to 50%), a reduction of energy consumption (up to 30%) and an improvement in environmental performance, whilst delivering superior performance in terms of overall service quality, safety and customer experience in rail transport.

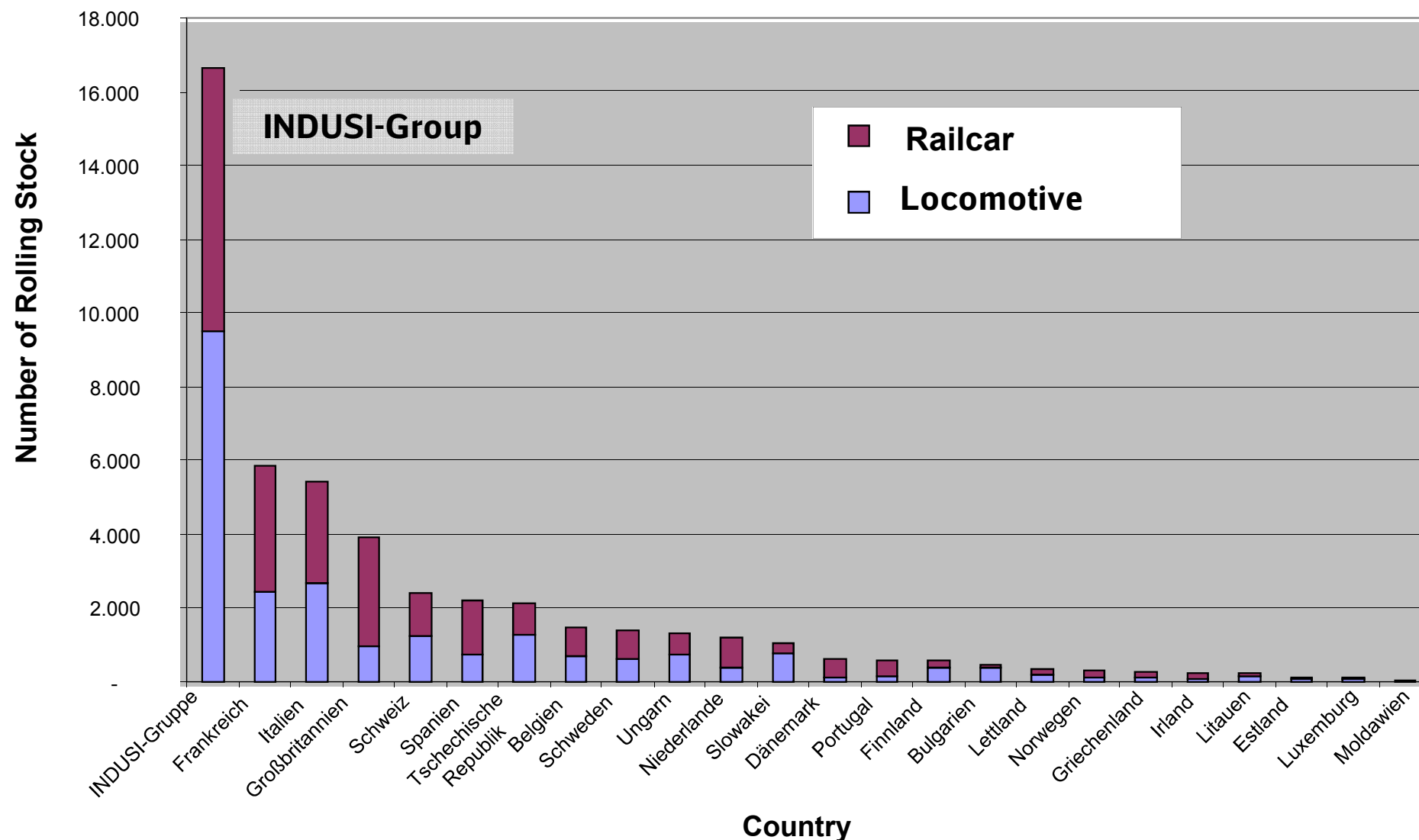
**Summary:** Scope of the MG 2.3 is too huge to cover everything. Therefore we will just focus on the On-Board signaling part as a follow-up Project of openETCS.

Total number of all locomotives in the ETCS-area 48 986

Subset of INDUSI Group: 16,600 locomotives



# Total number of locomotives in the INDUSI group in relation to other national ATP systems

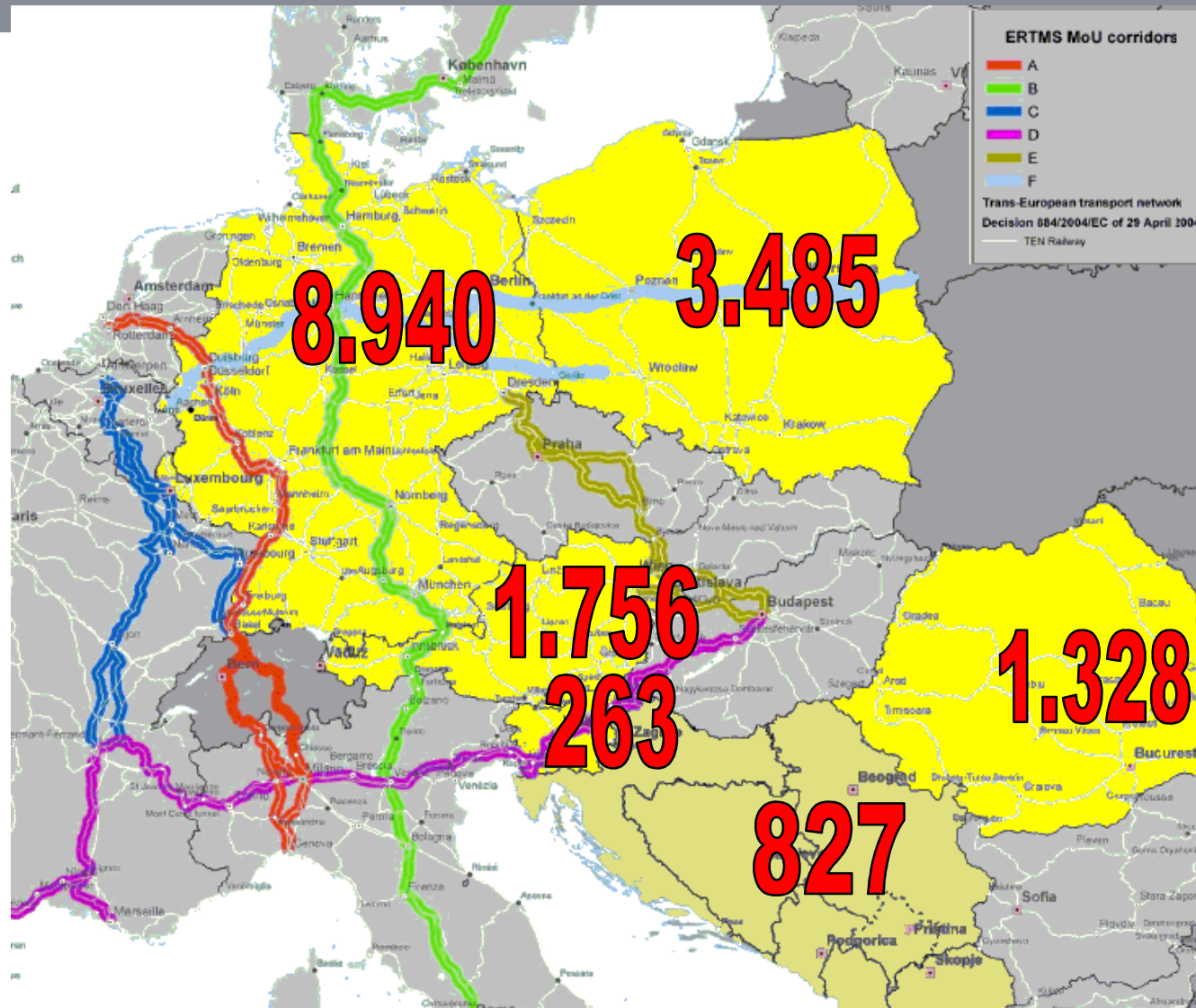


DB-vertraulich

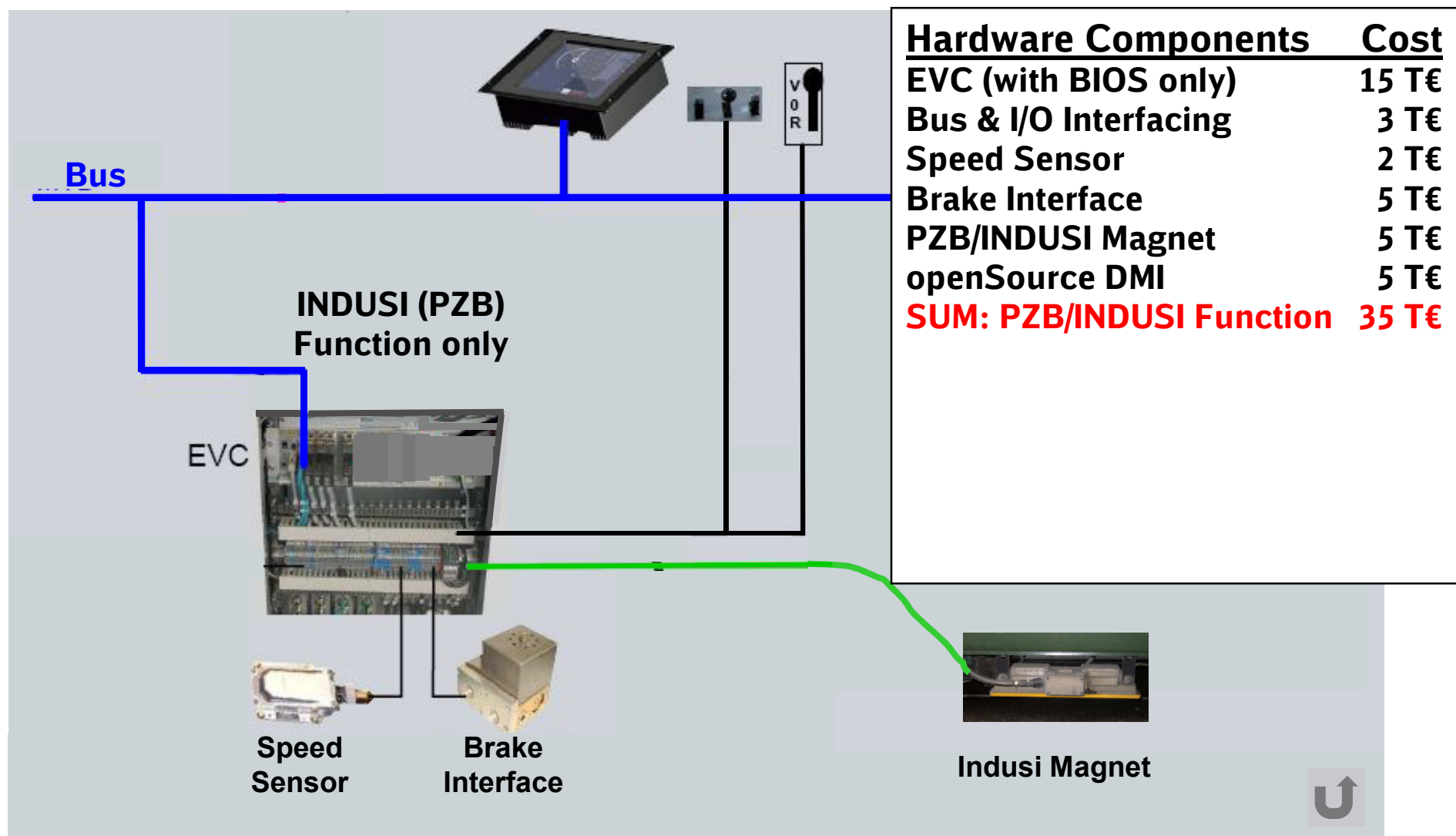
***For industry, a huge market: 16,600 locomotives D-base package for "INDUSI group": D, A, PL, SL (Former YU)***

**DB** Mobility  
Networks  
Logistics

*openETCS*



**openSTM: COST ESTIMATE for ETCS / INDUSI base Line Equipment**  
**Configuration: INDUSI (PZB) Function only with ETCS upgradeability**



**openSTM: COST ESTIMATE for ETCS / INDUSI base Line Equipment**  
**Configuration Next Step: ETCS & INDUSI (PZB) Function without Software**

