



Horizon 2020 call: openETCS@ITEA2 proposal

MG.2.3 – 2014: New generation of rail vehicles

supported by:



Federal Ministry
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and Research



Région de
Bruxelles-
Capitale



GOBIERNO
DE ESPAÑA

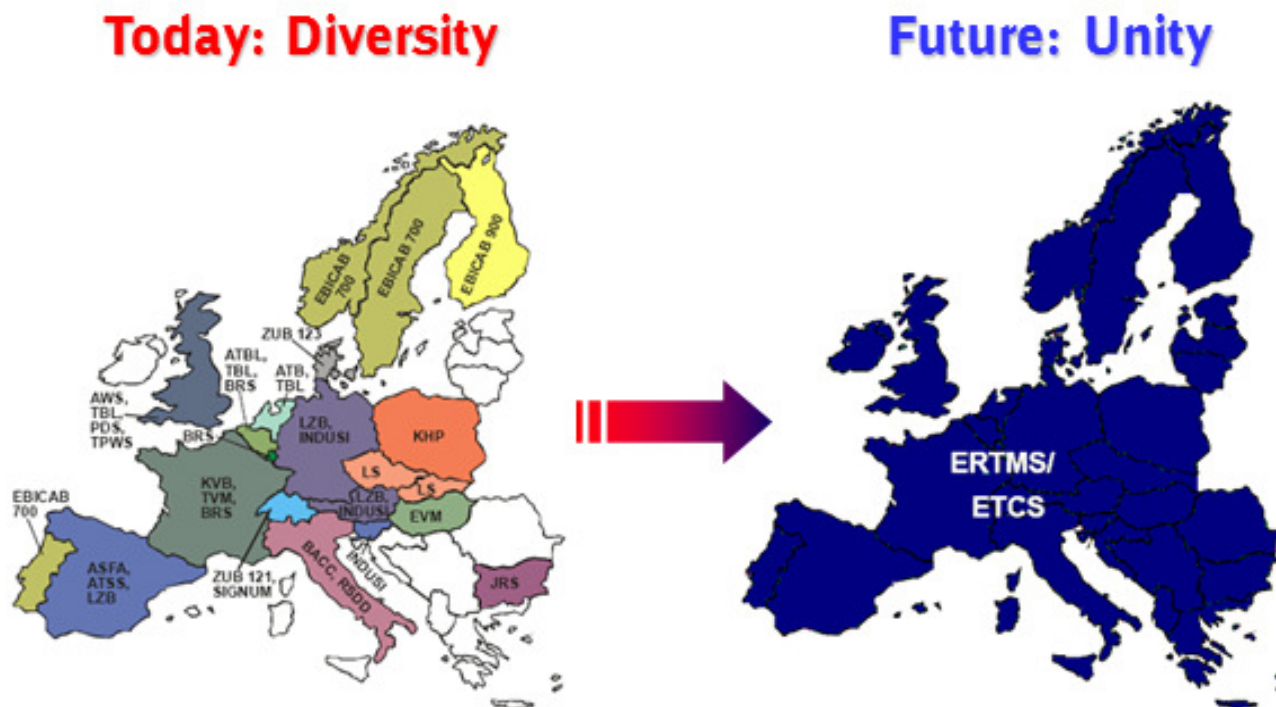
MINISTERIO
DE CIENCIA
E INNOVACIÓN

openETCS@ITEA2 Project

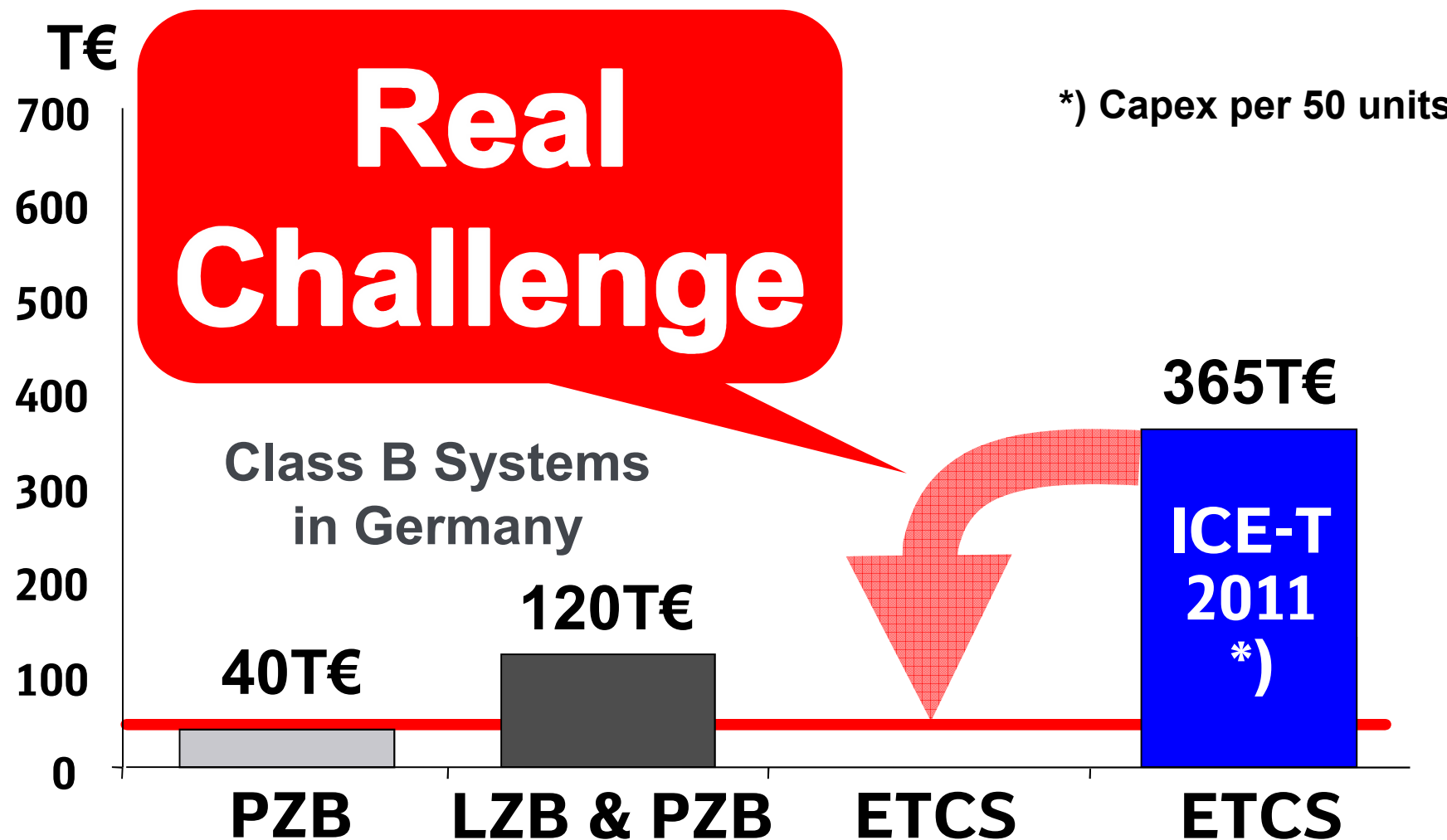
Baseliyos Jacob, DB Netz AG

Munich, 16.01.2014

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



OBU Capex: legacy PZB vs. ETCS



What is “openETCS”?

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

openETCS @ ITEA2 Project



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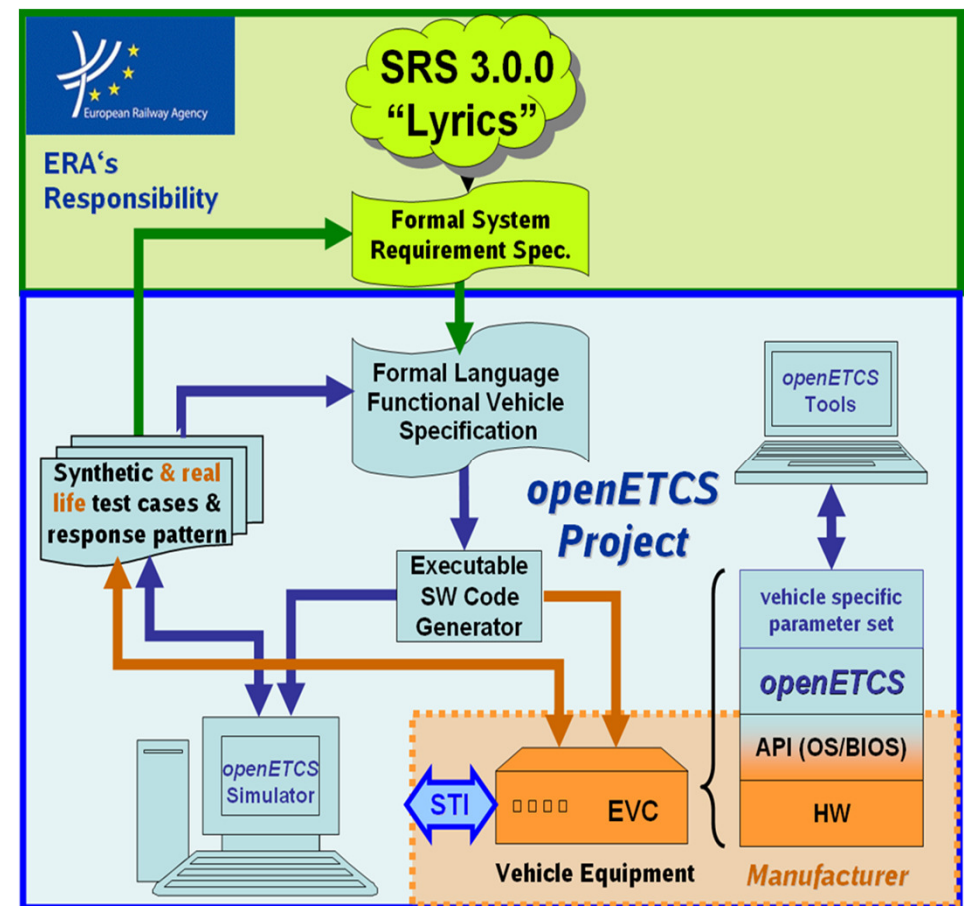


openETCS

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



Lessons Learned

- **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

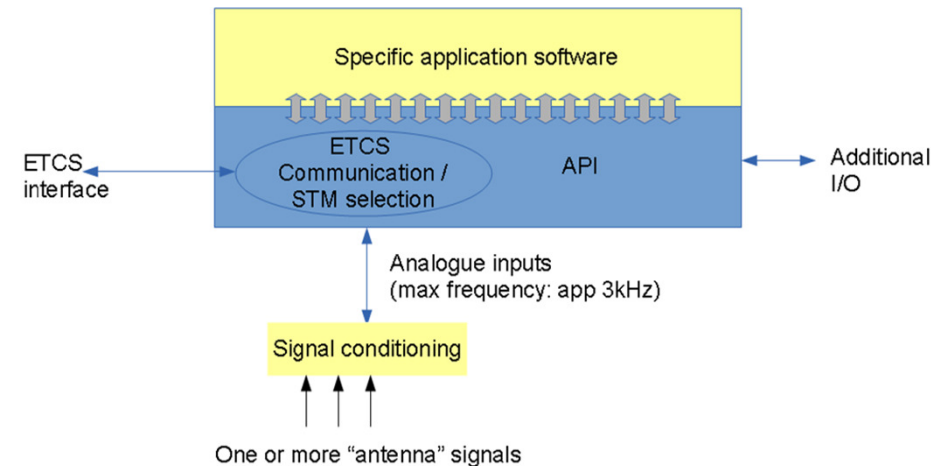
- software as a service
- greater level of competition

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

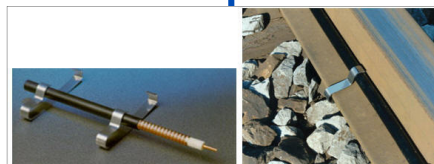
EVC

FFFIS

FIFFS

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



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

Socio-Economic Goals

Follow UP project@Horizon2020

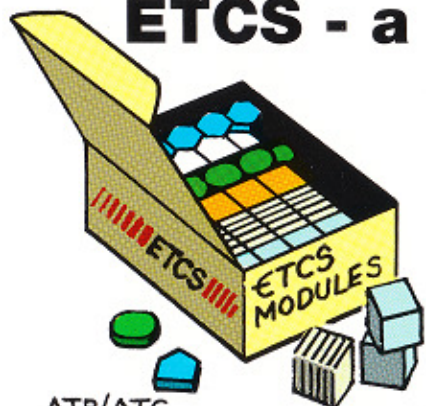


- **Support migration strategy of ERTMS**
- **Promotion and acceleration of innovation development**
- **Adaption of the innovations into the european railway market**
- **Reinforce the european railway market**
- **Increase passenger and freight train capacity**
- **Economies of scales**

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

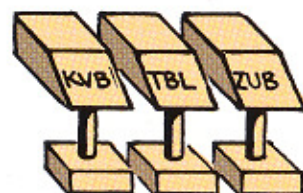
ODOMETER,
ROUTE MAP,
RECORDING UNIT,
ETC.

INTERFACES

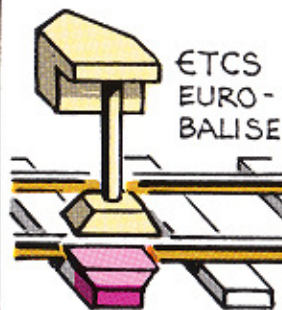
ETCS BUS

LZB

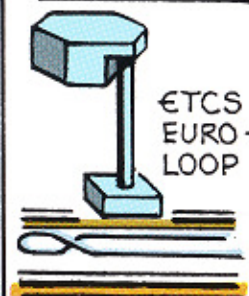
TVM



ANTENNAS FOR
EXISTING SYSTEMS
(OPTIONAL)



ETCS
EURO-
BALISE

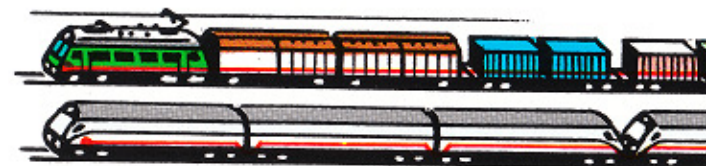


ETCS
EURO-
LOOP

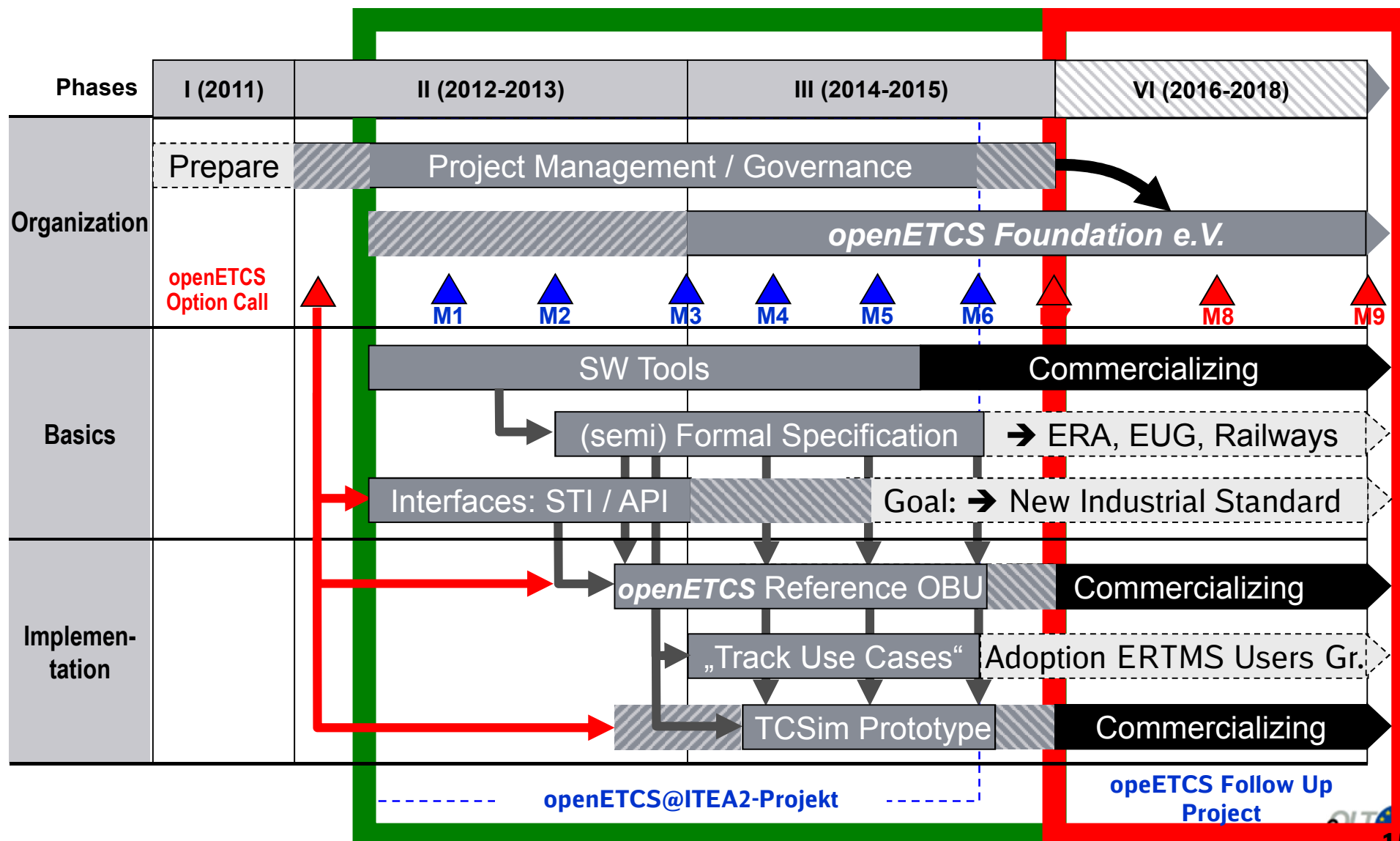
GSM



ETCS
EURO-
RADIO



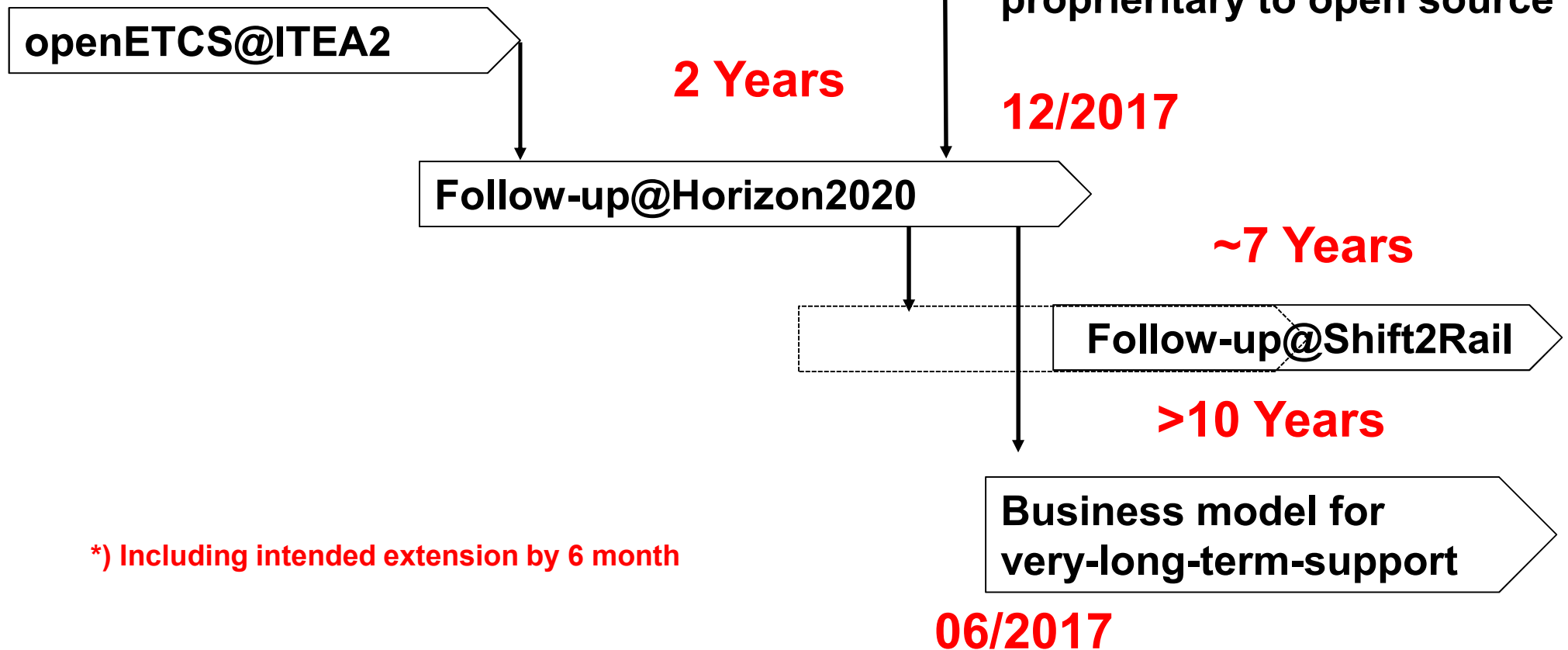
openETCS Project Schedule Overview



Time-line of proposed Follow-Up projects

12/2016 ICE-T Baseline 3
open source SW

3,5 Years *) 06/2015



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

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 – Upcoming Events
- 2nd open proposal workshop@Brussel (CER/UIC)18.02.2014
www.openetcs.org – Upcoming Events
- 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 and in copy to 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)**

Next Events

Please visit us:



www.openetcs.org

@Upcoming Events

1st open proposal workshop@University of Brunswick 11.02.2014 –
www.openetcs.org – Upcoming Events

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

Please confirm your participation to one of the events: Horizon2020@openetcs.org

We appreciate every further proposal@the workshop!!

Please send us your proposal to: Horizon2020@openetcs.org and in copy
baseliyos.jacob@deutschebahn.com

Location

@Upcoming Events

1st open proposal workshop@University of Brunswick 11.02.2014 –
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
www.openetcs.org – Upcoming Events

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

Questions

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 differenz 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 ...*

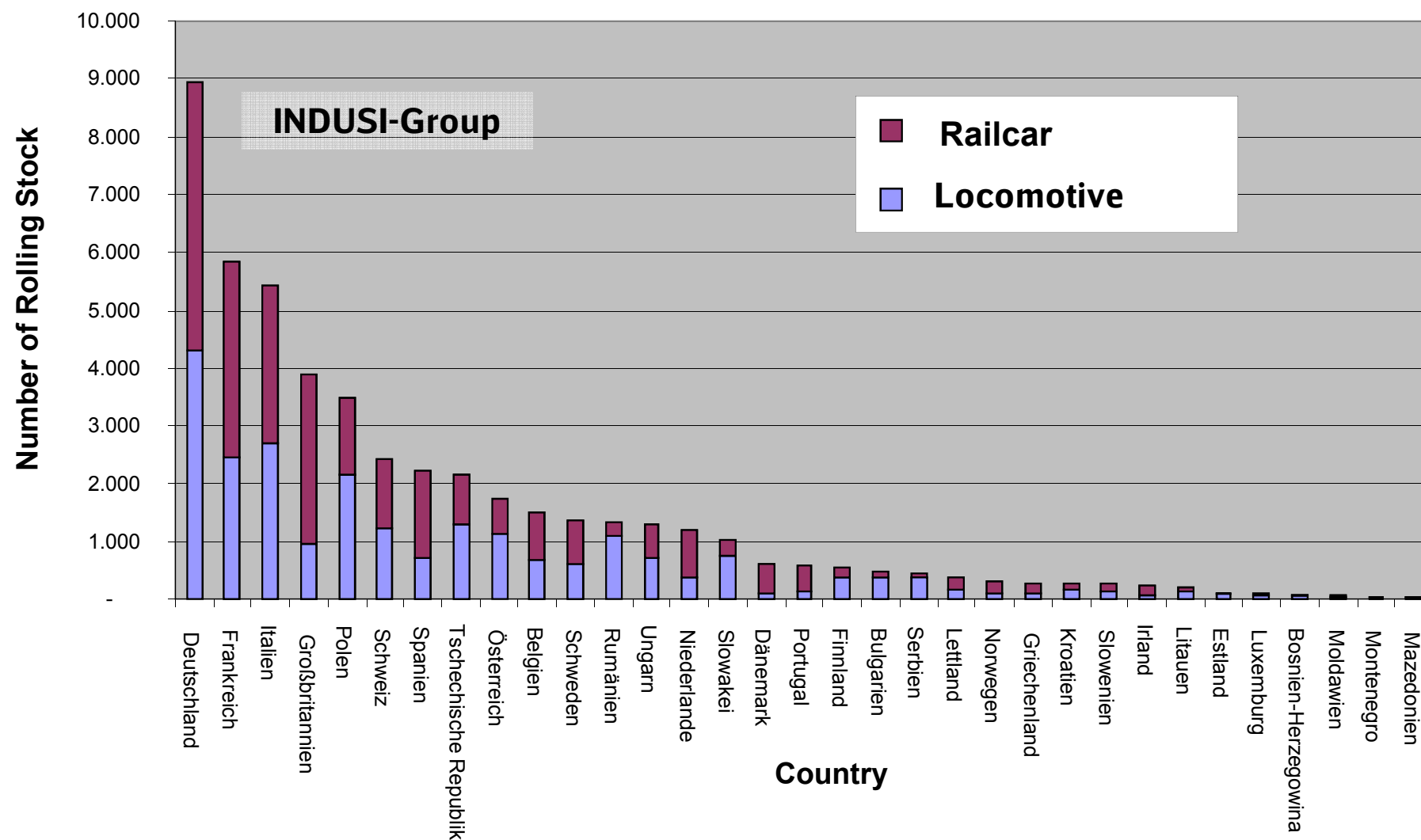
Expected impact: The key goal will be to deliver a reduction of up to 40% in life cycle costs of rolling stock products, an increase in passenger train capacity up to 15%, reductions of downtime by increased reliability (up to 50%), a reduction of energy consumption (up to 30%) and an improvement in 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.

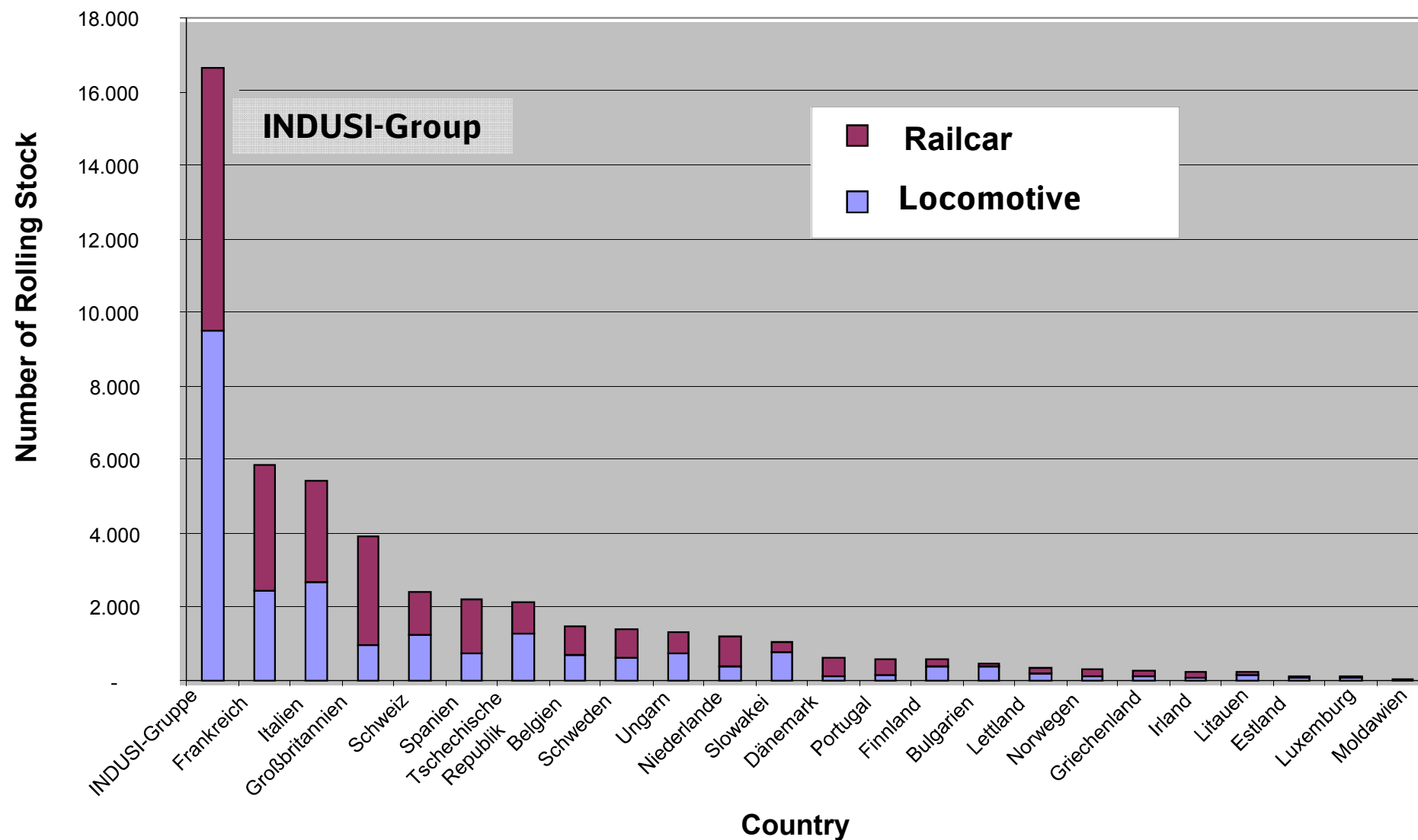
Total number of all locomotives in the ETCS-area 48 986

Subset of INDUSI Group: 16,600 locomotives

openETCS



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

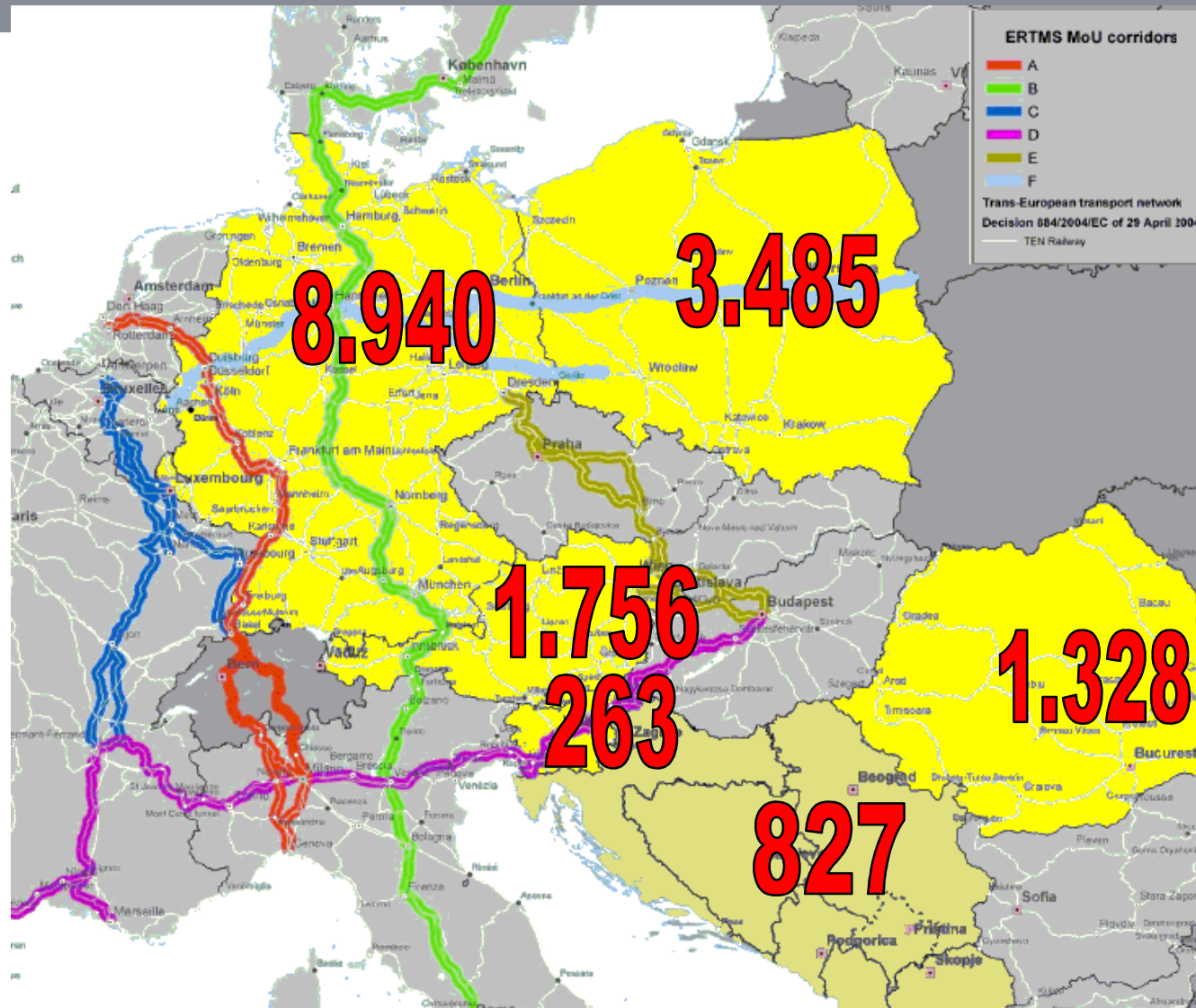


DB-vertraulich

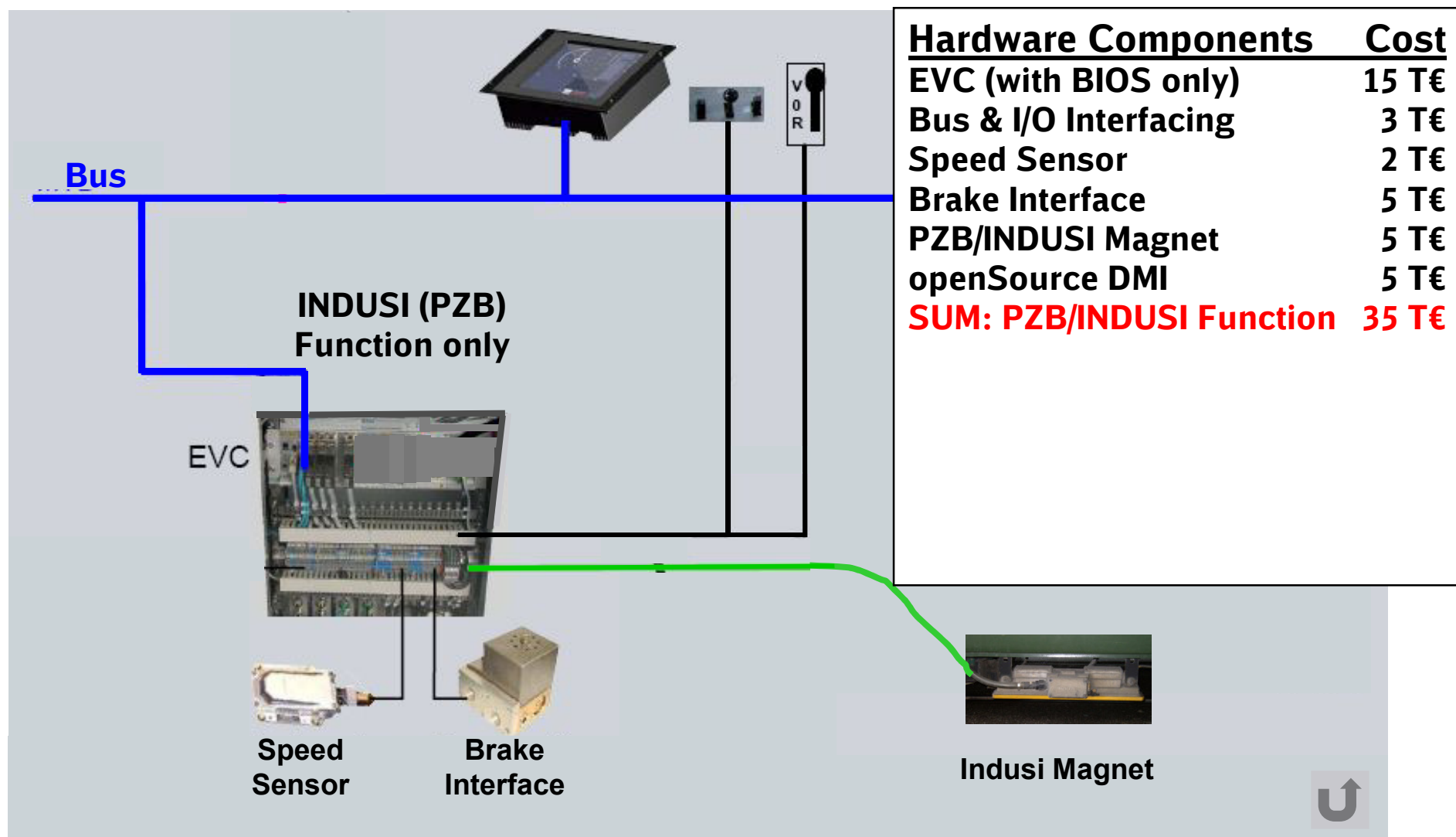
For industry, a huge market: 16,600 locomotives D-base package for "INDUSI group": D, A, PL, SL (Former YU)

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

