The UIC ERTMS REGIONAL project

On its way forward

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The different type of rail operation
(Scope extension of the TSI’s)

- High-speed passenger trains
- Conventional passenger/freight trains
- Local passenger trains

- High-speed lines
- Conventional TEN lines
- Conventional main lines
- Conventional regional lines
- Conventional local lines
Overview: Interoperability Directives & TSI’s, Train management systems, Interlocking, Radio block center, ERTMS, GSM-R radio +++ Management, signalling & GSM-R Operational rules, etc.

Traffic Management: Eur-Optirails
- Strategic management
- etc.

Signalling: INESS Integrated European Signalling System (proposed)
- Remote control automated/manual
- Track-side occupancy proving based block control, safe route setting
- Control of level crossings
- Control of Switch points, ...
- Control of line side signals
- etc.

Train control-command: ETCS European Train Control System
- Automatic train protection and warning
- Automatic train command with in-cab signalling
- Train-side location based block control
- etc.
ERTMS REGIONAL, a level 3 architecture

ERTMS REGIONAL a track side ERTMS concept

GSM - R

Interlocking and Radio block

Object controller

Eurobalise

Integrity

Level 3
Level 2
Level 1

Eurocab
ERTMS REGIONAL a track side application

On board

ERTMS / ETCS & GSM-R TSI
Annex A compliant as well as the train integrity to be ensured

Track side
ERTMS Regional

Operational aspects will be based on the ERTMS operating rules plus some additional operational guidelines for an ERTMS-R application +
Development and implementation of the Train Control Centre functions including RBC, interlocking, object controller, etc.
Background

- UIC has, in cooperation with the European rail administrations, elaborated the Functional Requirements Specifications, FRS ERTMS REGIONAL for such track side ERTMS application
- 2004 BANVERKET (Sweden) launched a call for offer
- 2005 BANVERKET signed a contract with Bombardier for a framework agreement to install ERTMS REGIONAL based on this UIC ERTMS REGIONAL FRS specification
- 2006-2009 Risk analyses, update of UIC FRS and OS, elaboration of a System Requirement Specification (SRS)
- Tests successfully started April 2010
A first ERTMS Level 3 development

- The ERTMS REGIONAL is specified to work with either virtual fixed block or moving block.

- Moving block is for capacity reasons normally not relevant on a Regional line but reduces the engineering costs as well as installation and test costs.

- ERTMS REGIONAL is the first step towards the track side level 3 development.
ERTMS REGIONAL: Cost saving factors

- Staff reduction in stations (TMS integrated management)
- Less track side equipment (e.g. no complete radio coverage)
- No traditional interlocking, no lineside signals,
- Minimising cables by controlling objects via radio
- Track circuits and axle counters only on special locations
- Safety approach by considering a tolerable hazard rate
- Minimised trackside equipment will minimise maintenance
- Open interfaces to objects and sub systems
- Essential specifications in BV and UIC domain

It is estimated that the costs for ERTMS REGIONAL track side application is only half of a conventional signalling equipment (excl. GSM-R)
1. What is ERTMS Regional?

- Cost effective control command system for regional lines
- Based on ERTMS specifications
- The first ERTMS level 3 application, fixed block
- Onboard ERTMS adopted without changes
- New development for track-side equipment
1. What is ERTMS Regional?

- Cost effective control command system for regional lines
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- Onboard ERTMS adopted without changes
- New development for track-side equipment
... eliminates the need for trackside equipment, signals & trackcircuits
Specifications available and UIC activities

Status of the ERTMS Regional specifications
UIC ERTMS REGIONAL specs/docs available
May 2010

- UIC FRS version 3.08
- UIC Operational scenarios version 1.08
- UIC draft operational rules (for initial disc.)
- UIC GRS version 1.0
- UIC RAMS version 1.0
- CMI Study (role of the dispatcher) *(only on the UIC WEB)*
BV ERTMS REGIONAL specs available March 2008

- BV FRS, 2.0
- BV GRS, 2.1
- BV RAMS, 7.0
- BV DRS, 3.5
- BV SRS, 3.5
- Interface specs. to objects available ultimo 2009
  (the red circles on the block diagram slide)
Interface specs at FFFIS level available
(The red marked on the slide 16)
Example interface H

Interface A) TCC - Object controller FFFIS available
Interface B) Object controller point machine available as template in the UIC GRS spec.
Note to be developed at national level,
Skeleton for a National GRS

ERTMS Regional
General Technical Requirements Specification
GRS

Version: 01.00 DRAFT 1.02  20-01-06
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ERTMS Regional General Technical Requirements Specification, draft 01.06
Interface spec. FFFIS, A) TCC – OCS available
List of content, (the spec. contains 50 pages)

1 EXECUTIVE SUMMARY
2 REFERENCE DOCUMENTS
3 DEFINITIONS
4 VERSION MANAGEMENT
5 ARCHITECTURE OVERVIEW
6 LOWER PROTOCOL LAYERS
7 APPLICATION PROTOCOL
8 UNIT IDENTIFICATION
9 PACKET DEFINITIONS
10 VARIABLE DEFINITIONS
Vision of availability for the interface specs.

• Interface A standardised
• Interface B specified at national level based on the UIC GRS template
• All interfaces on the block diagram (red marked circles) should/could follow this idea
Outlook 2010- 2012
UIC ERTMS Regional Project activities
2010 - 2012

- Consider the BV development and pilot test runs
- Identify administrations which have interest in ERTMS Re
- Capturing the interested rail administrations points of view and requirements and use it as input for the UIC specs
- End 2012 to have available
  - A UIC ERTMS REGIONAL FRS
  - A operational scenario spec.
  - A operational rules document
  - A UIC skeleton GRS spec. including the architecture
  - A UIC skeleton RAMS spec. including the architecture

*It should be the aim to support the railways interested in a development of a European core SRS as well as a core pattern for the interface FFFIS specs. available for those administrations who support and will carry out this “homework” considering their national track side equipment, e.g. point machines*
UIC ERTMS Regional Project ongoing and planned activities 2010 - 2012

• Involvement of ERA in the development of the ERTMS REGIONAL operational rules (Wish to be agreed)

• UIC Train Integrity investigation activities, next steps
  - State of the art of the technology
  - Lessons learnt regarding present products
  - TIMS specification review, compliance, etc.
UIC activities 2010-2012
(in a European context)

- World premiere, i.e. ERTMS moving block introduced summer 2010 (joining and splitting and operation on a selected line section)
- Support to BV in elaboration of ERTMS Re (L3) test scenarios coordinated with L1 & L2 activities (the new test platform activity)
- Following the BV test line operation
- UIC disseminate in agreement with BV the relevant specifications, results etc. to its members
ERTMS Track side interface specifications

- Open interfaces to objects and sub systems
- Essential specifications in BV and UIC domain

An important question to be addressed

- Which railways will support such an approach?
- The open interface strategy can also be relevant for some level 1 level 2 interlockings
ERTMS REGIONAL development in Sweden

- First test runs successful started April 2010
- Final safety assessment as well as to be completed
- Conformity assessment by a Notified Body
- Commissioning of the pilot line end 2010
- From 2010 a roll out on regional BV lines up to 2015
Thank you

Questions?

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