

# UIC ERTMS World Conference Berne September 2007



## GSM-R Long Term Vision



Ola Bergman, Nokia Siemens Networks  
Speaker GSM-R Industry Group

# GSM-R Long Term Vision

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## Agenda

1. GSM-R World Wide Status & Potential
2. GSM-R Functional Evolution
3. GSM-R Platform Evolution
4. Improved ERTMS/GSM-R Validation
5. GSM-R Industry Group adapting to the maturing GSM-R environment

# GSM-R World Wide Status & Potential (1)



- ❑ Upon UIC initiative Railway Companies from **25 countries** signed up for GSM-R in June 1997 (MoU)
- ❑ During the ten years since then around **25 further countries** will introduce GSM-R – this adds up to **50!**
- ❑ All these together operate more than 200.000 km railway!
- ❑ All these together operate more than 100.000 locomotives!
- ❑ All these together employ more than 3 million people!

# GSM-R World Wide Status & Potential (2)



- ❑ Of the **50** countries committed to GSM-R **25** already are in different states of GSM-R implementation
- ❑ Of the **50** countries committed to GSM-R **5** already are using GSM-R in operation!
- ❑ 2007 is the year when see full migration to GSM-R...
- ❑ ...the Netherlands happened to be first!

# GSM-R World Wide Status & Potential (3)

## Netherlands:

- ❑ GSM-R is THE ONLY RADIO SYSTEM since 9 months
- ❑ GSM-R has proved itself during this time!
- ❑ 3100 km in operation (100 % of planned total) !
- ❑ All 2.500 Engines fitted with GSM-R !
- ❑ All EIRENE Mandatory Functions...
- ❑ ... plus many Options in operation!
- ❑ Roaming with Germany, Belgium and France  
for border crossing trains
- ❑ ETCS L2 on HSL Amsterdam – Belgium  
and Freightline Rotterdam - Germany
- ❑ GSM-R Operation outsourced



# GSM-R World Wide Status & Potential (4)



- ❑ At the end of 2007 5 countries in full GSM-R operation
- ❑ Prognosis for 2008 3 further countries
- ❑ Prognosis for 2009 2 further countries
- ❑ Prognosis for 2010 50% of the planned network in full operation

# GSM-R Long Term Vision

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## Agenda

1. GSM-R World Wide Status & Potential
2. GSM-R Functional Evolution

# GSM-R Functional Evolution (1)



Following Railways' developing needs:

- ❑ articulated as Change Requests to EIRENE, which are
- ❑ ... originated in UIC bodies (FG, OG and ERIG)
- ❑ ... discussed with Industry (GSM-R IG)
- ❑ ... channeled through CER and EIM to European Railway Agency ERA for approval
- ❑ ... may also require improvements of ETSI 3GPP specifications

# GSM-R Functional Evolution (2)

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## EIRENE evolution:

- ❑ Version 5/13 issued by UIC in December 2000
- ❑ Version 6/14 issued almost 3 years later in October 2003
- ❑ Version 7/15 another 2 ½ years later in May 2006
- ❑ Version 8/16 planned to be issued by UIC in spring 2008, i.e. around two years after the previous version

# GSM-R Functional Evolution (3)



## EIRENE evolution:

- ❑ Long term GSM-R IG planning within the scope of GSM-R Version Management estimates around three years between consecutive EIRENE versions on average...
- ❑ ...hereby N-1 backwards compatibility considered as the best option, since
  - ❑ functional delta in installed base as small as possible
  - ❑ cost saving (number of interoperability tests minimized)

# GSM-R Functional Evolution (4)



UIC proposal for EIRENE 8/16 delta content:

- ❑ Improved "All Drivers in the Area" functionality (Late Entry)
- ❑ Improved Shunting, which also might include...
- ❑ ...Improved cell reselection mechanism in Group Calls
- ❑ Silent Joining in Group Calls
- ❑ Alert Dispatcher involved in Group Call
- ❑ GPRS as bearer of ETCS L2/3
- ❑ ETCS Only Radio (EDOR)
- ❑ Enhanced Quality of Service (QoS) specifications

# GSM-R Functional Evolution (5)

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Potential delta content beyond EIRENE 8/16 :

- ❑ Improved Border Crossing functionality (FFFS)
- ❑ enhanced Railway Emergency Call eREC
- ❑ ...

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# GSM-R Platform Evolution



Following Railways' needs for long term investment protection:

- ❑ Platform for EIRENE Voice Services
- ❑ Transmission Platform for ETCS Levels 2 and 3 appl.
- ❑ Platform for miscellaneous optional data services (GPRS)
- ❑ Will improve and be available for the next decades
- ❑ Continuously improved price/performance
- ❑ Benefits from public market developments
- ❑ ...

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# Improved ERTMS/GSM-R Validation(1)



## Essential Requirement on GSM-R:

- ❑ Validation of EIRENE End-to-End Functionality while preserving Interoperability
  - ❑ of interconnected GSM-R Networks
  - ❑ of Network Elements in one Network
  - ❑ of Terminals with Networks
- ❑ all supplied by different Vendors
- ❑ two concurrent EIRENE versions (N and N-1)
  
- ❑ Until now a fragmented approach with Global Network IOTs and National (Field) Tests was applied

# Improved ERTMS/GSM-R Validation(3)



## Within the Scope of GSM-R Version Management:

- ❑ A structured validation approach with "full coverage"...
- ❑ ...addressing all important interoperability aspects...
- ❑ ...network-network, mixed networks, terminal-network
- ❑ N-1 backwards compatibility
- ❑ Will improve quality and reduce costs
- ❑ Generic validation could preferably be done in a permanent **European Test Lab for GSM-R...**
- ❑ ...which could go into service during 2008...
- ❑ ...subject to funding!

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# GSM-R Industry Group Future



Following the maturing European GSM-R environment:

- ❑ GSM-R IG is amending its MoU from year 2000
- ❑ The Amendment will cover GSM-R IG work to support and participate in the Change Control Management CCM process of ERA...
- ❑ ...and to develop and implement GSM-R Version Management
- ❑ The main portion of CCM work is done in close cooperation with UIC bodies...
- ❑ ...but GSM-R IG also participates in ERA Control Group CG and Change Control Board CCB
- ❑ The amended MoU will be available on IG's [www.gsm-rail.com](http://www.gsm-rail.com)...
- ❑ ...our home page (currently under reconstruction)

# Summary

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- **GSM-R is a mature and widely used system...**
  - **... developing into a World standard**
  - **... in successful operation**
  - **... interoperable**
  - **... stable but still open for improvement**
  - **... future proof**
  - **GSM-R recommended**