Introducing RDS-TMC in Slovakia

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Agenda

1. Technology RDS-TMC.
2. Situation in Slovakia prior to starting project Connect.
3. Main milestones reached (within Connect), 2006 progress (plans and reality).
3 Transmission of traffic information through RDS-TMC system

What is RDS?
RDS (Radio Data System) uses the technique of **adding data** to a sub-carrier on an existing stereo **transmission** in such a way that the data is carried inaudibly.

What is TMC?
The Traffic Message Channel (TMC) is a specific application of the FM Radio Data System (RDS) used for broadcasting real-time traffic and weather information. Data messages are received silently and decoded by a TMC-equipped car radio or navigation system, and delivered to the driver in a variety of ways. The most common of these is a TMC-enabled navigation system that can offer dynamic route guidance - alerting the driver of a problem on the planned route and calculating an alternative route to avoid the incident.
Simplified architecture of RDS-TMC system

Architecture of RDS-TMC system

User of RDS-TMC service

TMC message content:
- Type of event
- Location
- Extent
- Duration
- Diversion advice

Sources of data on traffic

Administration of communications

Police

Other sources

Detection systems

Data collection & verification

ALERT coding

Radio company

TIC – Traffic Information Center. Provider of RDS-TMC. Processing of data on traffic.

Distribution of traffic information

Radio company
4 Situation in Slovakia prior to starting project Connect

- Some broadcast transmitters already equipped with RDS (but not with TMC) encoders – which made a potential for introducing TMC service.
- Partial information for travellers was available through radio broadcast or on web pages (Slovak Road Administration).
Main milestones reached
(within Connect project)

- Translation and transposition of EN ISO 14819 - Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 1, Part 2 and Part 3 translated and transposed to Slovak technical standards system.
- Developed a national location table.
- An event list translation, both required to support a TMC service, have been developed.
- Proposal of Broadcast Network for RDS-TMC.
- Study analysing technical aspects of introduction (Encoders equipped with RDS-TMC).
- A pilot project under way (Experiments with broadcasting, stage 1, 2, 3).
Translation and transposition of EN ISO 14819

- European standard EN ISO 14819 - Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 1, Part 2 and Part 3 was translated into Slovak language and implemented into Slovak technical standards system. This standard contains the Slovak version of event list and basis methodology for preparing Slovak national tables for RDS-TMC.


Proposal of Broadcast **Network** (for RDS-TMC)

- VUS made specifications of a radiobroadcast network aimed at distribution of traffic information in Slovakia using RDS-TMC so that all Slovak territory (road network) is covered.
- The basic network will use predominantly public radio stations (partly also commercial radio stations).
- Mainly public transmitters, in problematic areas supplemented transmitters run by other providers.
- Proposal of a core network for optimal coverage of Slovakia with RDS (by VUS): **public radio network** – core: Slovenský rozhlas 1. In problematic areas supplemented by other public radio Devin and public radio Regina.
Signal coverage computed from selected FM transmitters (plan)
Network Coverage in Slovakia

- From the picture (signal coverage), it is obvious that majority of Slovakia will be covered. Comparing with road map, one may say that the area coverage proposal is sufficient with respect to TMC requirements.
Study analysing technical aspects of introduction

- Analysis of **Slovakia current status** and conditions, which have to be created for RDS-TMC implementation.
- Status of RDS-TMC in other **EU countries**.
- Which transmitters to choose (public).
- Who should carry out the service (public broadcast transmitters).
- Administration of location tables.
- Inspiration from TMC Forum.
- Feasibility of ways of transmission of relevant data.
- Encoders equipped with RDS-TMC.
Study analysing technical aspects of introduction

- Within the study, an analysis of transmitters allocated for TMC broadcast network in terms of transmission and RDS technology was performed.
- A special attention was paid to the way how to transport RDS information to the transmitters. The study analyses possibilities of distribution of RDS signal to the particular transmitters (differentiated by modulation lines) and respecting economy aspects.
- There are more alternatives, how to transmit relevant data:
  1. Radio-relay routes, inclusion of a transmitter into the existing network of transmitters.
  2. Signal transmission by means of satellite technology.
  3. Signal transmission from transmitter to transmitter (Ballenphang method).
Transmission of signals between transmitters 2

• **Each** method for signal transmission is **feasible** and comes into account. They all need additional investment and operating cost coverage.

• For the transmitters which are not part of the network, economically **Ballenphang** method seems to be the best solution.
Encoders used

• RDS encoders: Slovak market uses products by
  – Rohde&Schwarz (DE),
  – Audemat-Aztek (Fr) and
  – Phobos Engineering (Cz).

• **Not all** products do make it possible to include dynamic messages into RDS, i.e. TMC coding (group 8A in RDS).

• In the current proposed network, **18** transmitters are able to code group 8A.
Encoders Makes

RDS encoder DIGIPLEXER FMX 480

RDS encoder PHOBOS EC 2005 X (Expresnet)

RDS encoder Rohde&Schwarz DMC 01T

RDS encoder Audemat Aztek FMB 80
A pilot project underway

- Goal and Scope: to verify the **transmissional functionality** end-end
- Collection of information from suppliers.
- Processing of information at Traffic Information Center (TIC).
- Broadcast of information through RDS.
- Reception of information by end users.
- Pilot Schedule
Pilot Schedule


- Phase 2 (6/2005-10/2005): Testing a network, including Ballenphang method of transmission. To verify the functionality of the system within radio broadcast network aimed at providing TMC service.
  - Phase 21 (6-8/2005): verification of transmitters via rr (radio relay) network.
  - Phase 22 (10/2005): verification of transmitters via other modulation links.

- Phase 3 (2006). Preparation of messages in a real center (a possible seed of Traffic Information Center).
Phase 1 (rr transmission)

- Successful transmission of group 8A in the transmitters.
- Successful transmission of single group and multigroup messages with different number of repetitions.
- Implemented in 6-8/2005.
- Transmitters involved: Banská Bystrica (Suchá Hora), SRo 1 (90,1 MHz) and Banská Bystrica–mesto, Devín, s (102 MHz).
- Monitoring of RDS was performed by:
  1. Professional monitoring system by Teli-Ericsson
  2. Free monitoring system by Esslinger.
Physical Arrangement of a system for Phase I of the pilot project (rr)

Editorial and transmission part
- Editorial workplace
  - Bratislava - Kamzík
- Editorial software
  - 1/ Profi
  - 2/ WinProfi
  - 3/ Arcos
- RDS encoder
  - SRo 1: 90.1 MHz
  - Audemat-Aztec
  - Digiplexer FMX 400, resp.
  - SRo 2: 102 MHz
  - Rohde & Schwarz
  - Radio Data Codec DMC 01
- RR transmission

Reception part
- Professional monitoring system by Teli-Ericsson
- Free monitoring system by Esslinger
- Transmitter
  - Banská Bystrica
  - ERP = 100 kW; 90.1 MHz, resp.
  - Banská Bystrica-mesto
  - ERP = 80 W; 102 MHz
Phase 2
(network and alternative transmission)

• Successful transmission of group 8A on one transmitter receiving the signal via alternative connection. Success of one group and multigroup messages with different number of repetitions.
• Carried out in October 2005.
• Tested Group 8A.
• Transmitter tested Borský Mikuláš (SRo 2, frekvencia 102,8 MHz) – an example of a transmitter receiving the signal via alternative way.
Physical Arrangement of a system for Phase II of the pilot project (Ballenphang method)

Editorial and transmission part

- Editorial workplace: Bratislava - Kamzik
- Editorial software: 1/ Profi, 2/ WinProfi, 3/ Arcos
- Transmitter: Borský Mikulaš
  - ERP = 1 kW
  - 102.8 MHz
  - Bratislava, Nitra
- RR transmission
- RDS encoder
- RDS kódovač
  - Sro 1, 96.6 MHz, 91.2 MHz
  - AUDEMAT-AZTEC
  - DIGIPLEXER FHM 480

Reception part

- Professional monitoring system by Teli-Ericsson
- Free monitoring system by Esslinger
- RDS Receiver
  - INFOTELECOM FM 30
- RDS kódovač
  - Sro 2, 102.8 MHz
  - AUDEMAT-AZTEC
  - FMB 80
- RDS encoder
Technical Issues

• Transmitter Borský Mikuláš (BM) (ERP = 1kW). For the transmitters which are not part of the network, economically, the best way to transport signal is ballenphang method. Goal: to verify this method. To get RDS data from other transmitters, on BM transmitter was installed an antenna system collecting the signal and directing it into receiver RDS/MBS FM 30. This receiver was able to catch and decode RDS, MBD od RDBS data carried by FM signal.

• The output connected to the input of RDS encoder of BM transmitter. The received data inserted into FM signal and repeatedly transmitted from the transmitter (Ballenphang). Signal collected from Bratislava (Kamzík, 96,6 MHz, 100 kW) Nitra (Zobor, 91,2 MHz, 10 kW).

• Tested area was given by the coverage of BM transmitter.
2006

• Study of a system of **transborder cooperation** and interoperability of RDS-TMC services.
• Study of a proposal of **web portal** (content, form) to provide dynamically updated traffic information including links to similar portals abroad and cooperation with ERIC. Possibilities of broadcasting traffic information through **digital television** (DVB) and radio (DAB, DRM).
• Preparation of Traffic Information Center, **TIC** (BA).
• Pilot: Phase 3.
Phase 3: Start of Pilot project of RDS-TMC in Slovakia

May – Dec 2006, national TIC (Slovak Radio, Bratislava), Participants: SW/Location tables suppliers, Transmittion operator

So far no location tables for Slovakia in navigation systems are available.

ITC Bratislava '07, 11.-12.9 2007, Research Institute of Posts & Telecommunications
4.5 Work done in Phase II

- Pilot project of broadcasting RDS-TMC. Slovak Radio company provided room and staff (connected to RDS network, 80% TMC coverage) and staff, Eastwood provided SW, VUS provided HW).

- At present, tests are being carried out (entering an event and event transmission) – irregularly.

- Expected cross-border activities and co-operation: First preliminary contacts made with Cz and AT with regard to the location table (made by Geomatika, creator of the national location table). The data to be incorporated into the location table have been mutually exchanged.
  - It should be decided, on an international level, type of information and way of the exchange (cross-border).
CMS – Introductory page

(editorial system to process RDS TMC data, within the trial, used SW from Ostrava company, adapted)

Output: Implementation of digital maps and location table into software application (Bratislava area).
Short recap of progress until 2006

1. Translation and transposition of EN ISO 14819: (Traffic and Travel Information (TTI) - TTI Messages via traffic message coding - Part 1, Part 2 and Part 3 translated and transposed to Slovak technical standards system, including the event list translation).


5. The informal agreement on the future cooperation between Slovak broadcaster and transmission operator for RDS-TMC broadcasting has been reached.

6. Pilot projects: First experiments (simulations) with broadcasting, stage 1 and 2, samples of TMC information successfully transmitted.

7. A feasibility study of RDS-TMC system in Slovakia including ways of cross border cooperation and interoperability of RDS-TMC services.

Activities in 2007

1. The subject matter encompassing RDS-TMC location tables of Slovakia has moved from MDPT SR (Ministry of Transport, Posts and Telecommunications) to Slovenska sprava ciest (Slovak Road Administration) which became a new responsible person for the location tables.

2. The coordination committee of CONNECT project, Slovensky rozhlas and Slovenske Radiokomunikacie (Slovak Radiocommunications) have agreed upon the follow up of the pilot project in terms of broadcasting RDS-TMC information for travelers in 2007.

3. Within the pilot project, stage 3, technically, the process of providing for broadcasting real traffic information from all territory of Slovakia is being completed. This encompasses the establishment of call center and deployment of application software for TIC (Traffic Information Center) including the maps covering all Slovakia (scheduled for April to June 2007).

4. Basic RDS-TMC service should be offered to all end-users in Slovakia free of charge. In this context, it will be necessary to solve financial and legislative issues in terms of financial coverage of costs of RDS-TMC service which may arise to the statutory subject of (Slovensky rozhlas) carrying out the operator role.

5. Next, it will be necessary to prepare a regulation or agreements so that all statutory institutions (such as Police, Narodna dialnicna spolocnost (National Motorway Company), self-governments) will be obliged to submitting traffic information to call center on a regular basis.

6. It is expected that, sometime in 2007, Slovensky rozhlas will start setting up a network of local traffic informants.

7. In the second half of 2007, real time trial operation of RDS-TMC for all territory of Slovakia is due to start.

8. From the begin of 2008, the trial operation is expected to result in offering regular RDS-TMC service.
Conclusions

• Globally, the activities aimed at introduction of RDS-TMC in Slovakia in progress.
• Real traffic of RDS TMC – To be started in the second half of 2007 (and arguably without national TIC).
Thank you for your attention!

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