Future alternatives to GSM-R

Sniady, Aleksander; Soler, José; Dittmann, Lars

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DTU Fotonik
Department of Photonics Engineering

Future alternatives to GSM-R

Aleksander Sniady, PhD Candidate
José Soler, Associate Professor (Lektor)
Lars Dittmann, Professor

Signalling is as fundamental contributor to a **robust railway system**. European Railway Traffic Management System (ERTMS) enhances dynamic train control, interoperability and track utilization. **GSM-R is a communication subsystem in ERTMS**.

Shortcomings of GSM-R as a railway communication:

- capacity issues (low efficiency)
- low network utilization
- lack of modern data services

LTE advantages over GSM-R in railway environment:

- efficient radio interface offering **large capacity**
- packet switched network – **high utilization**
- low delay and high throughput for **modern services**

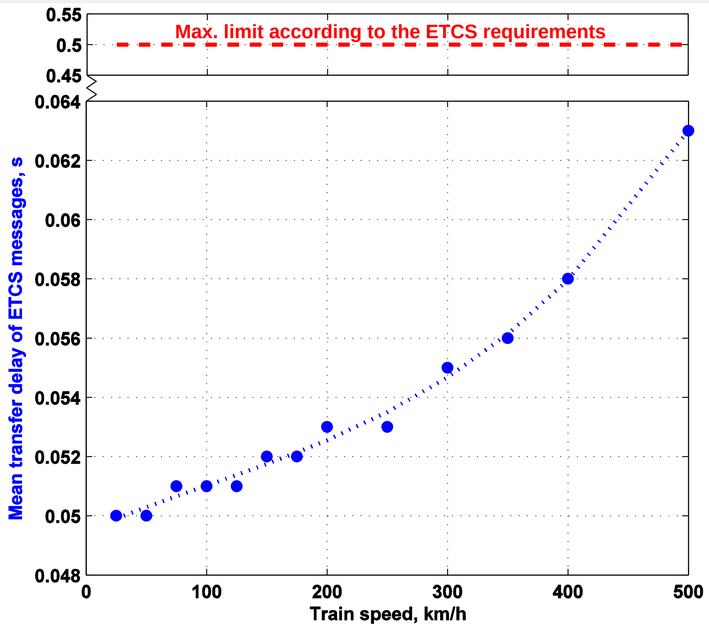
Can LTE become an alternative to GSM-R?

Research questions:

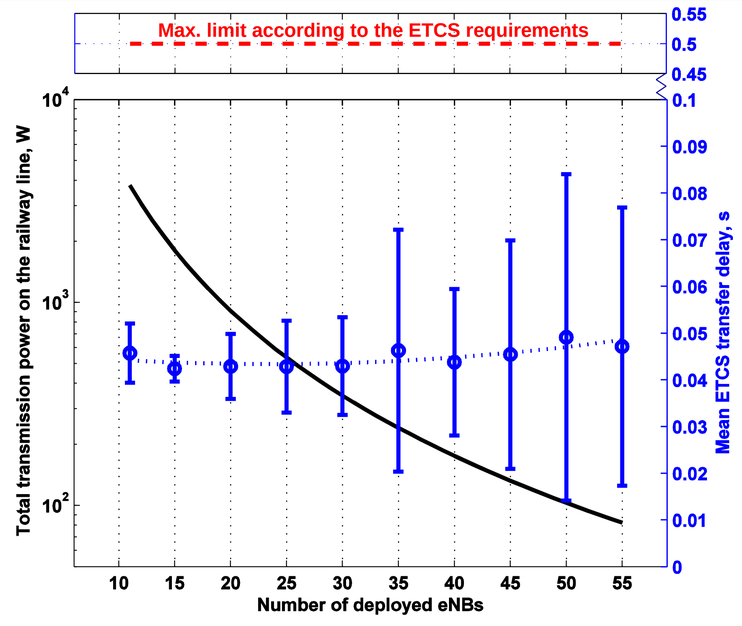
1. **Support for safety critical applications in LTE**
   (December 2012 – May 2013)
   - Does LTE fulfil requirements of ETCS signalling?

2. **QoS mechanisms**
   (May 2013 – August 2013)
   - Can LTE simultaneously provide safety-critical and other best-effort applications?

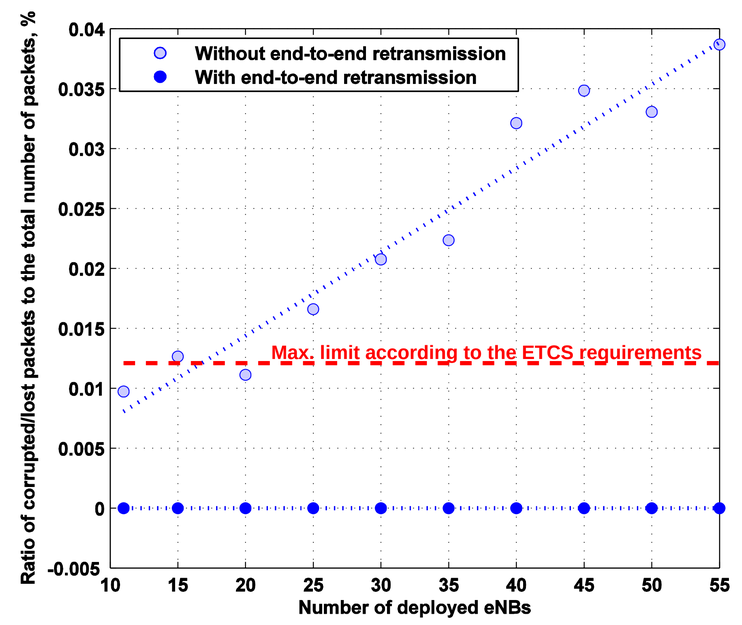
3. **Voice communications for railways**
   (May 2013 – November 2013)
   - Can LTE provide all the advanced voice functionality required by railways?



Relation between **train speed** and the **mean transfer delay** of ETCS messages. The results have been obtained from OPNET simulations modelling a railway line between Snoghøj and Odense.



Relation between the **number of the eNodeBs** deployed along the Snoghøj-Odense railway line and: (i) **total transmission power** of all of these eNodeBs (analytical results); (ii) **downlink transfer delay** of ETCS messages (simulations results).



Relation between the **number of the eNodeBs** (LTE base stations) deployed along the Snoghøj-Odense railway line and the ratio of **corrupted/lost ETCS messages to the total number of ETCS messages** in the downlink direction.

RobustRailS

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