Mini conference on
"Robust Railway Operations: Best Practice and Challenges"
Technical University of Denmark (DTU), October 3, 2013

We are happy to announce a mini conference on Robust Railway Operations presenting examples of best practice, discussing future challenges and barriers and meeting leading researchers of the area.

Preliminary programme

8.30-9.00	Coffee/tea
9.00-9.30	***Welcome, overview of RobustRailS*** by David Pisinger, Professor, DTU Management Engineering
9.30-10.10	***Positioning systems and railway signalling technologies – IFSTTAR's contributions*** by Marion Berbineau, Research Director, French Institue of Science & Technology for Transport, Development and Networks (IFSTTAR)
10.10-10.50	***Robust Railway Operations: Best Practice and Challenges*** by Jan Peleska, Professor Dr. habil., University of Bremen and Verified Systems International GmbH
10.50-11.10	Coffee break
11.10-11.40	***Realtime Rail Traffic Management*** (with focus on necessary preconditions) by Sune Vendelbo Enevolsen, TMS expert, Banedanmark
11.40-12.10	Presentation (title to be announced) by Julie Jespersen Groth, DSB S-tog
12.10-13.00	Lunch
13.00-14.00	Short presentation of RobustRailS PhD projects:

- ***A framework for Rolling Stock Rescheduling*** by Jørgen Thorlund Haahr, PhD student, DTU Management Engineering
- ***Measuring Network Effects and Robustness in Railway Timetables*** by Lars Wittrup Jensen, PhD student, DTU Transport
- ***The passenger perspective in robust railway operations*** by Jens Parbo, PhD student, DTU Transport
- ***Formal Development and Verification of Railway Control Systems*** by Linh Vu Hong, PhD student, DTU Compute
- ***Railway communication technologies: future opportunities*** by Aleksander Sniady, PhD student, DTU Fotonik

14.00-15.00	***Best practice and challenges***: Discussion in groups
15.00-15.20	Coffee break
15.20-16.00	***Robustness in railway planning and operations*** by Leo Kroon, Professor of quantitative logistics at the Rotterdam School of Management, Erasmus University and Logistics Consultant at Netherlands Railways (NS)
16.00-16.20	Conclusion and international perspective

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The meeting is organized by RobustRailS, a research project lead by DTU (Management, Transport, Compute and Fotonic), sponsored by The Danish Council for Strategic Research (DSF). The research in RobustRails is focused on how the railway sector can become more green and sustainable by making the transportation system more punctual, reliable, highly frequent and comfortable, resulting in more passengers using rail transportation.

Leading international experts have been invited to present their research as well as some of the main Danish railway partners will give presentations at the mini conference. Furthermore PhD students from the RobustRailS project will give a brief presentation of their projects and there will be time for discussion of various railway topics in different groups. The purpose of the day is to bring robust railway operation into focus and bring main railway actors together. The outcome of the mini conference will serve as an important output for the further work of RobustRailS.

The mini conference takes place at DTU, Glassalen, Building 101, Anker Egelundsvej 1, 2800 Kgs. Lyngby.

Participation is free, but it is necessary to register by sending an email with name, title, company and e-mail to Administrative Coordinator Ivalo Jensen, e-mail: ivuj@dtu.dk; DTU Management Engineering, September 25 at the latest.

For further information about scientific content please contact Professor David Pisinger, e-mail: pisinger@man.dtu.dk; DTU Management Engineering.

The RobustRailS project is funded by the Danish Council for Strategic Research and runs for the four year period 2012-2015.

Further information about the project is available on the website: www.robustrails.man.dtu.dk from September 4.

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Abstract by Marion Berbineau, Research Director, French Institue of Science & Technology for Transport, Development and Networks (IFSTTAR):

Positioning systems and railway signalling technologies – IFSTTAR's contributions

Based on National and European projects in which IFSTTAR is involved, this presentation will provide a brief overview of new innovative functions for dependable safe signalling systems based on GNSS applications for fail safe positioning and railway signalling wireless technologies based on adaptable communications. High speed trains as well as conventional and urban guided systems are concerned.

Abstract by Jan Peleska, Professor Dr. habil., University of Bremen and Verified Systems International GmbH:

Robust Railway Operations: Best Practice and Challenges

During the last decade, the scientific progress, paired with an impressive increase of computing power, have led to numerous applications of formal methods in industry, supported by industrial-strength tools. A characteristic property of these tools is that formal methods are applied "under the hood", that is, tool-internally and without requiring specific expertise regarding the underlying mathematical formalisms. In this presentation it is described where these techniques and tools already have become best practices in the railway domain, or are likely to become widely adopted in the near future. We will illustrate how the validation of interlocking system configuration and safety can be automatically performed applying bounded model checking. Furthermore, it will be demonstrated how automated model-based testing can be effectively applied for the verification of both interlocking systems and on-board equipment.

The presentation is intended for an audience from different technical fields, so no prior knowledge about computer science and formal methods is required.

Abstract by Leo Kroon, Professor of quantitative logistics at the Rotterdam School of Management, Erasmus University and Logistics Consultant at Netherlands Railways (NS):

Robustness in railway planning and operations

In this presentation, we will give examples of models that have been developed for improving the robustness of railway systems, both in the planning stage and in the operations. The examples involve timetabling and rolling stock and crew scheduling. One of the examples deals with disruption management and in particular with the inherent uncertainty in the duration of a disruption: usually an estimate of the duration of a disruption is available at the start of the disruption, but this estimate may be quite inaccurate. By using an extended crew rescheduling model, the resulting crew schedules can better deal with this uncertainty in the duration of the disruption.

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