

# CATO

Eco-efficiency by Transrail



**transrail**

# The Challenge

Even if the railway system is a very energy efficient form of transportation, it needs to minimise energy consumption.

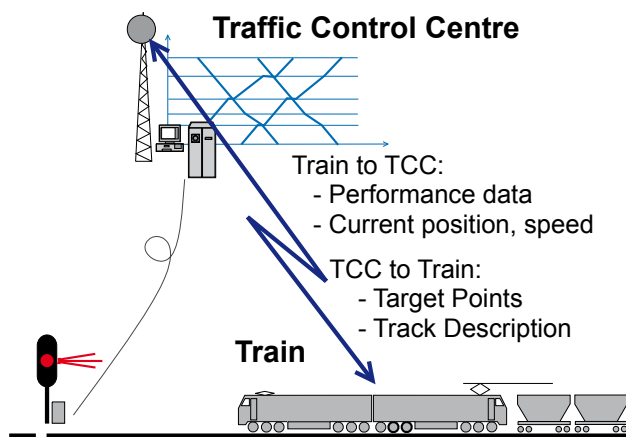
There is also a strong demand to increase the regularity and punctuality of the system and to optimise the utilisation of its expensive and often congested infrastructure.

However, efficient operations of trains cannot be achieved only by using conventional traffic management and signalling systems, and competent drivers and dispatchers.

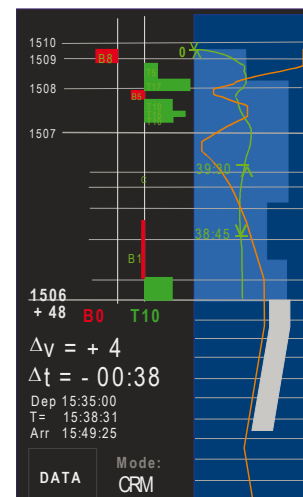
# The Solution

CATO (Computer Aided Train Operation) provides a traffic management system allowing trains to run as efficiently as possible considering the overall traffic situation on a railway line.

- CATO consists of two modules, CATO-TRAIN and CATO-TCC (Traffic Control Centre)
- Aimed both for train operators and infrastructure administrators
- CATO-TRAIN can be operated together with CATO-TCC or standalone
- Follows the European EETROP (Energy Efficient TRain OPERATION) draft interoperability standard
- Developed by Transrail with funding from the Swedish National Rail Administration and LKAB.



*CATO-TCC calculates an optimal real time schedule based on current train data and planned timetable. An individual schedule is then sent to each train via GSM-R radio. CATO-TRAIN calculates the optimal speed profile, and presents it to the driver for manual or autopilot operation*



*Driver's interface to CATO, displaying among other things the optimal speed profile*



## The Benefits

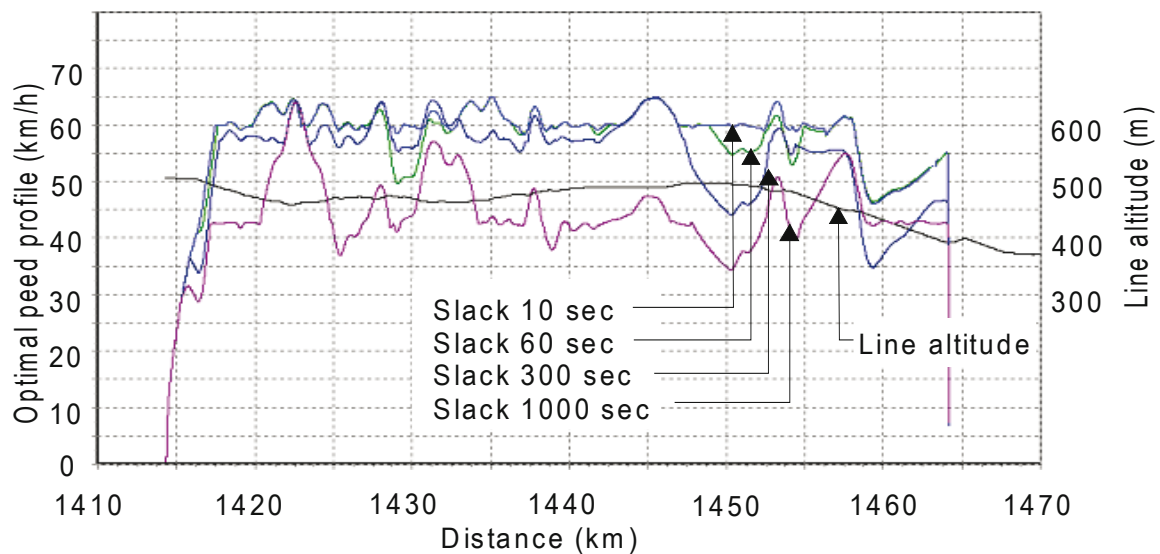
Trials on the LKAB iron ore railway lines have rendered the following

- Reduced energy consumption by 20-25%
- Increased line capacity by 10%
- Reduced maintenance cost for brakes by 30%

If applied to the Swedish railway system, this would yield yearly savings in the order of 34 MEUR

Other benefits

- Increased regularity and punctuality
- Reduced CO2 emissions (diesel powered trains)
- Improved utilisation of rolling stock and crews
- Better working environment



*The optimal speed profile depends on the slack times (i.e. time difference between minimum run time and available run time)*



# transrail



Transrail is a consultancy company on trains and railway systems for the future.

We are involved in

- research and development
- studies to enable decisions on strategies and investments
- planning, procurement and delivery projects
- operating and maintaining systems
- problem analysis and solution improvements
- hardware design

Based on this competence and our long experience of the railway sector, we have developed advanced IT systems in the areas of

- traffic
- schedule
- maintenance
- people management

for efficient planning and operation of railways.

Our Intelligent Transport Systems have special emphasis on simulation and optimization.

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