

# *Iron Ore Line* **STEG and CATO**



**[Optimal Networks for Train  
Integration Management across Europe]**

Collaborative Project  
7th Framework Programme

Uppsala University,  
Borlänge, October 2014

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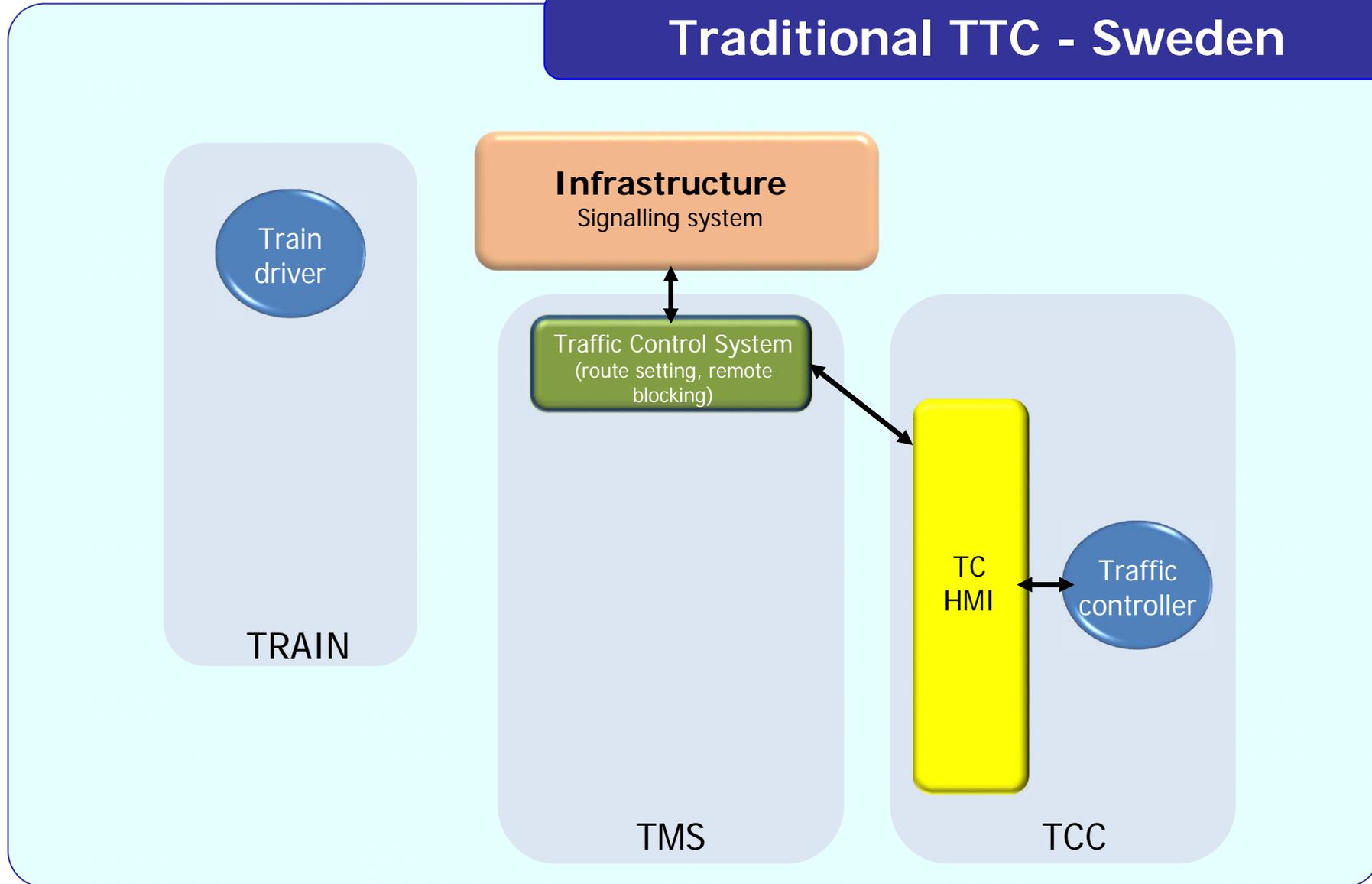
- Strategies for operational train traffic control
  - STEG and ON-TIME
- The STEG system in Boden
- STEG - CATO
- Future development



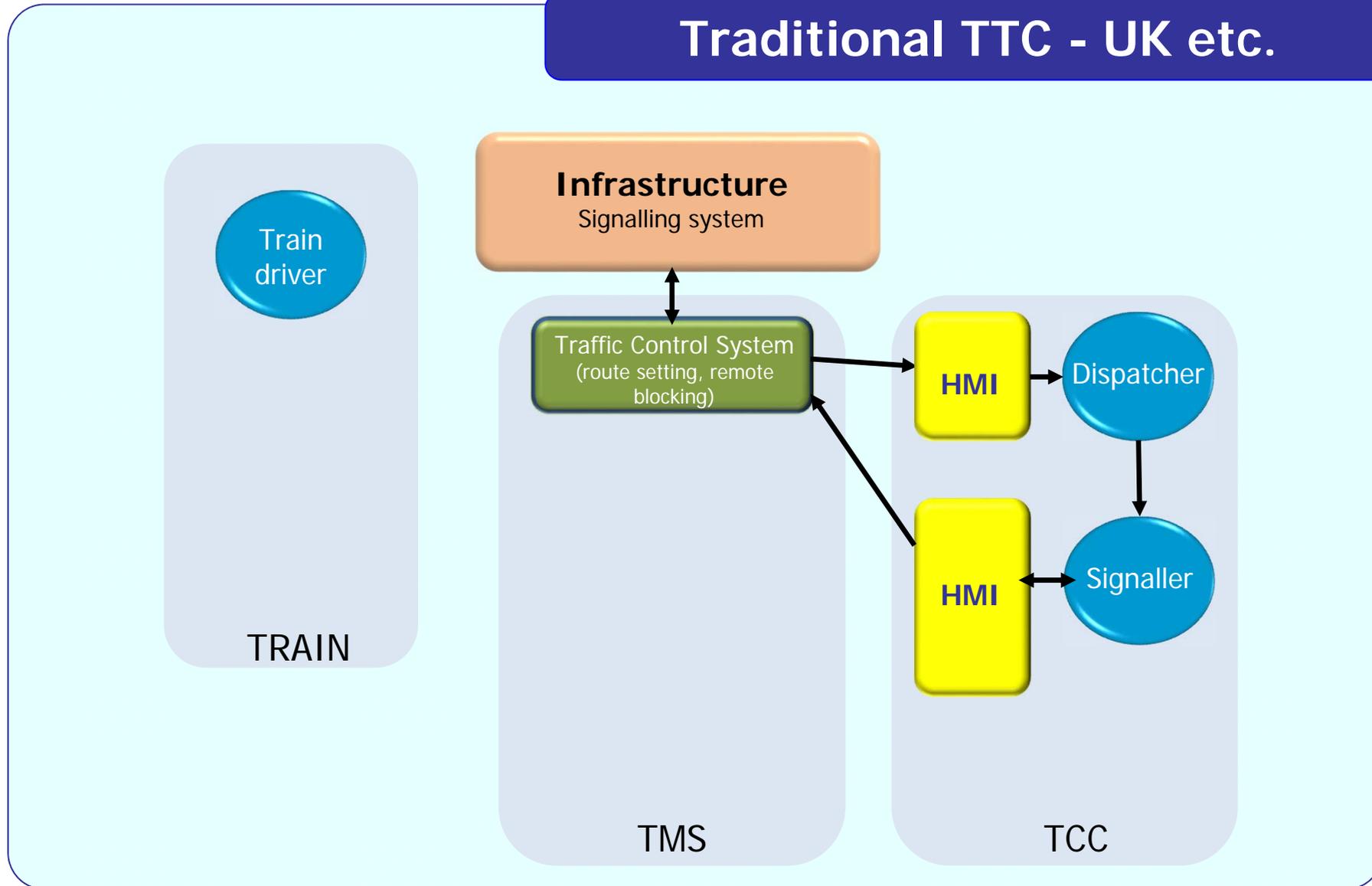
## STEG – Operational control

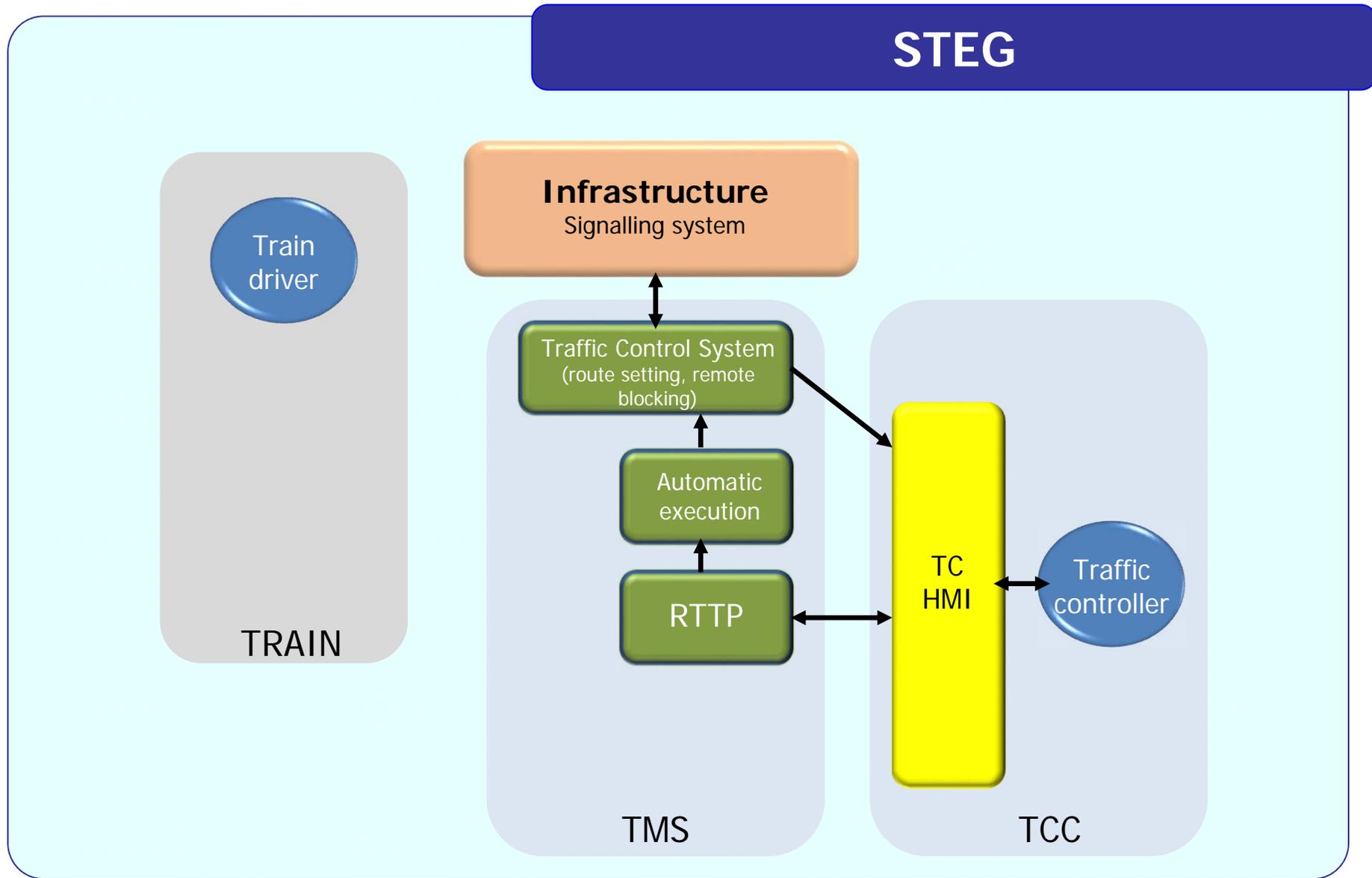
- Traditional TTC
  - Sweden
  - (Most) other countries
- The STEG – CATO solution
- The ON-TIME solution

# Traditional TTC - Sweden

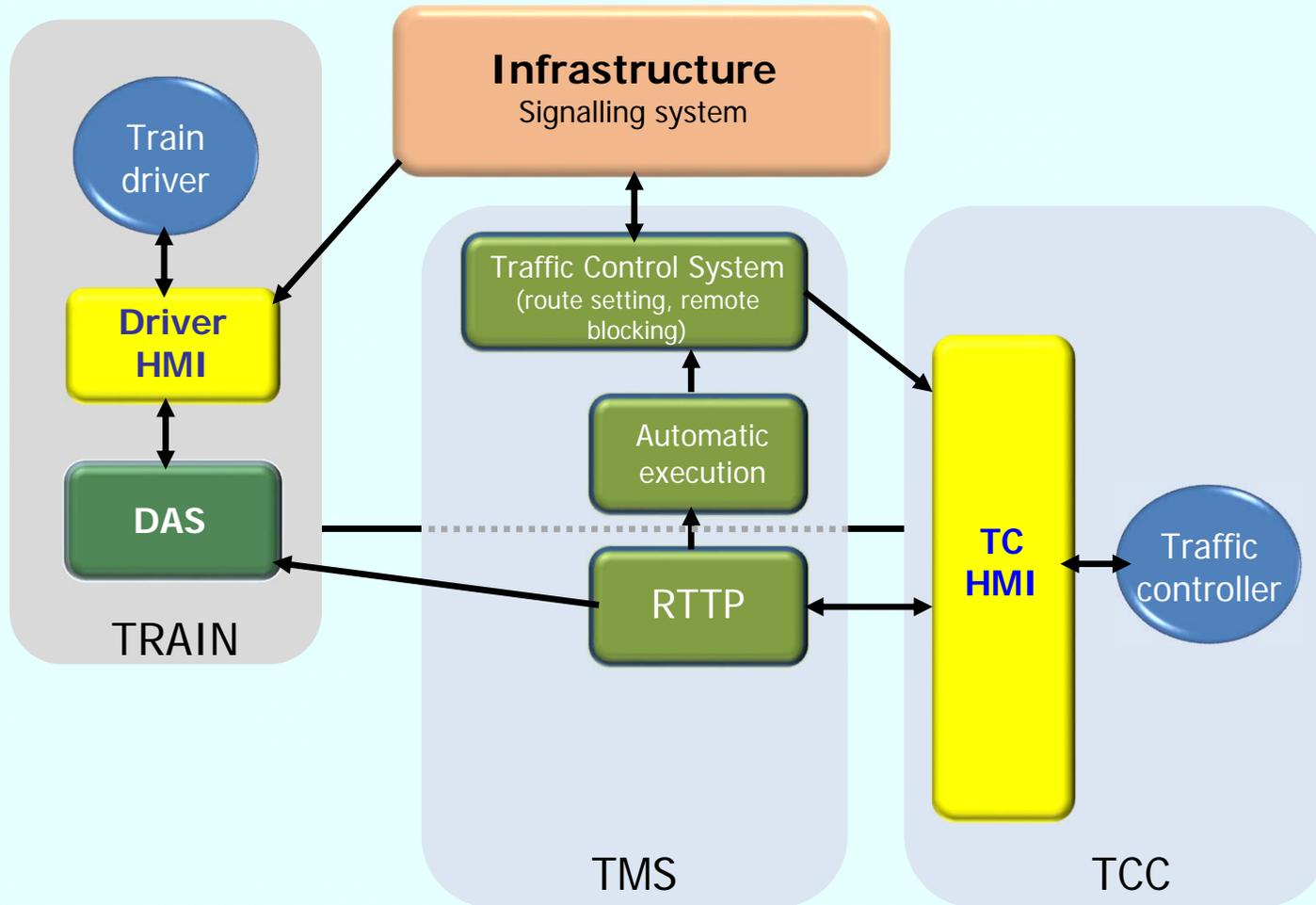


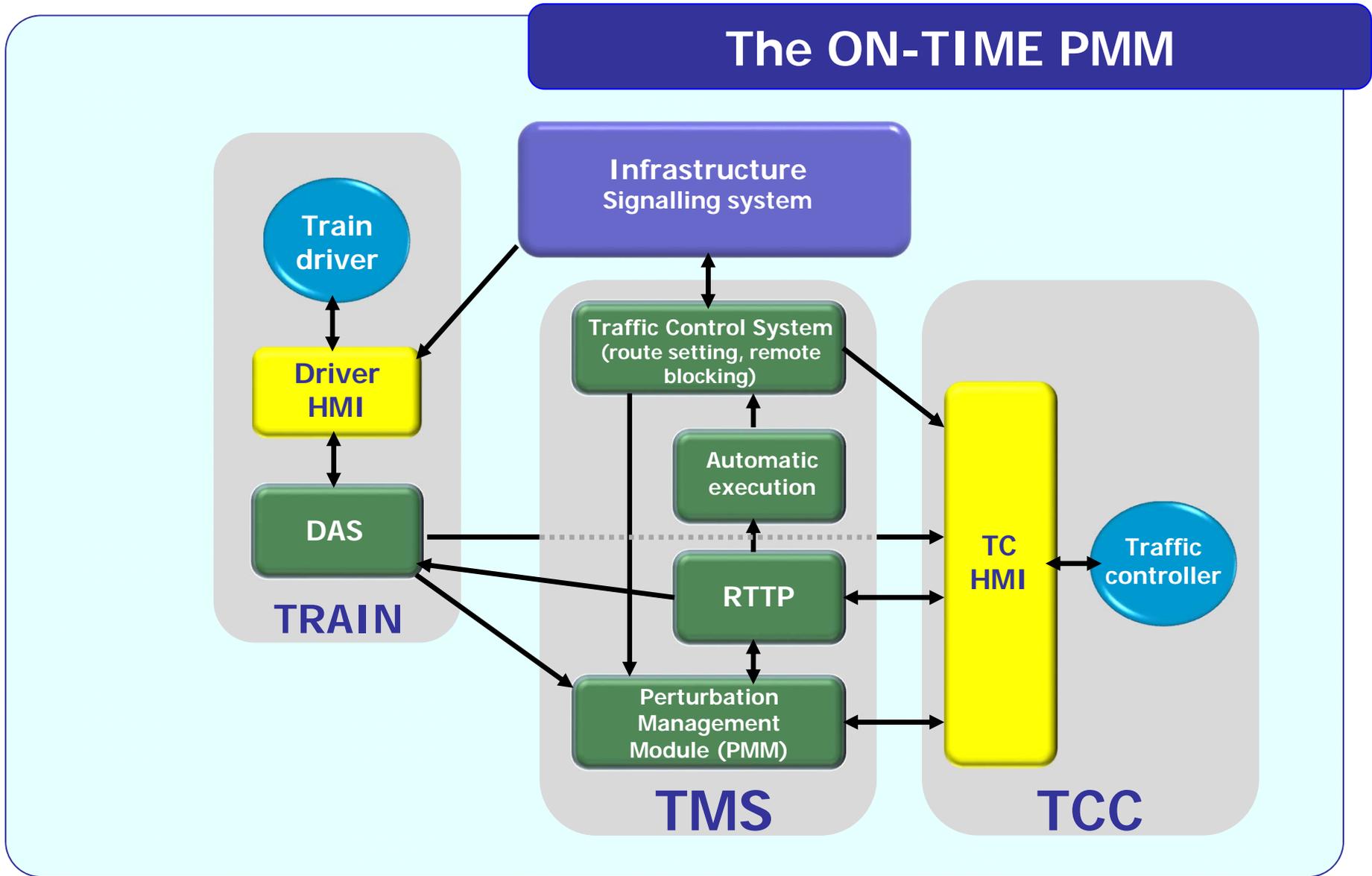
# Traditional TTC - UK etc.





# STEG - CATO



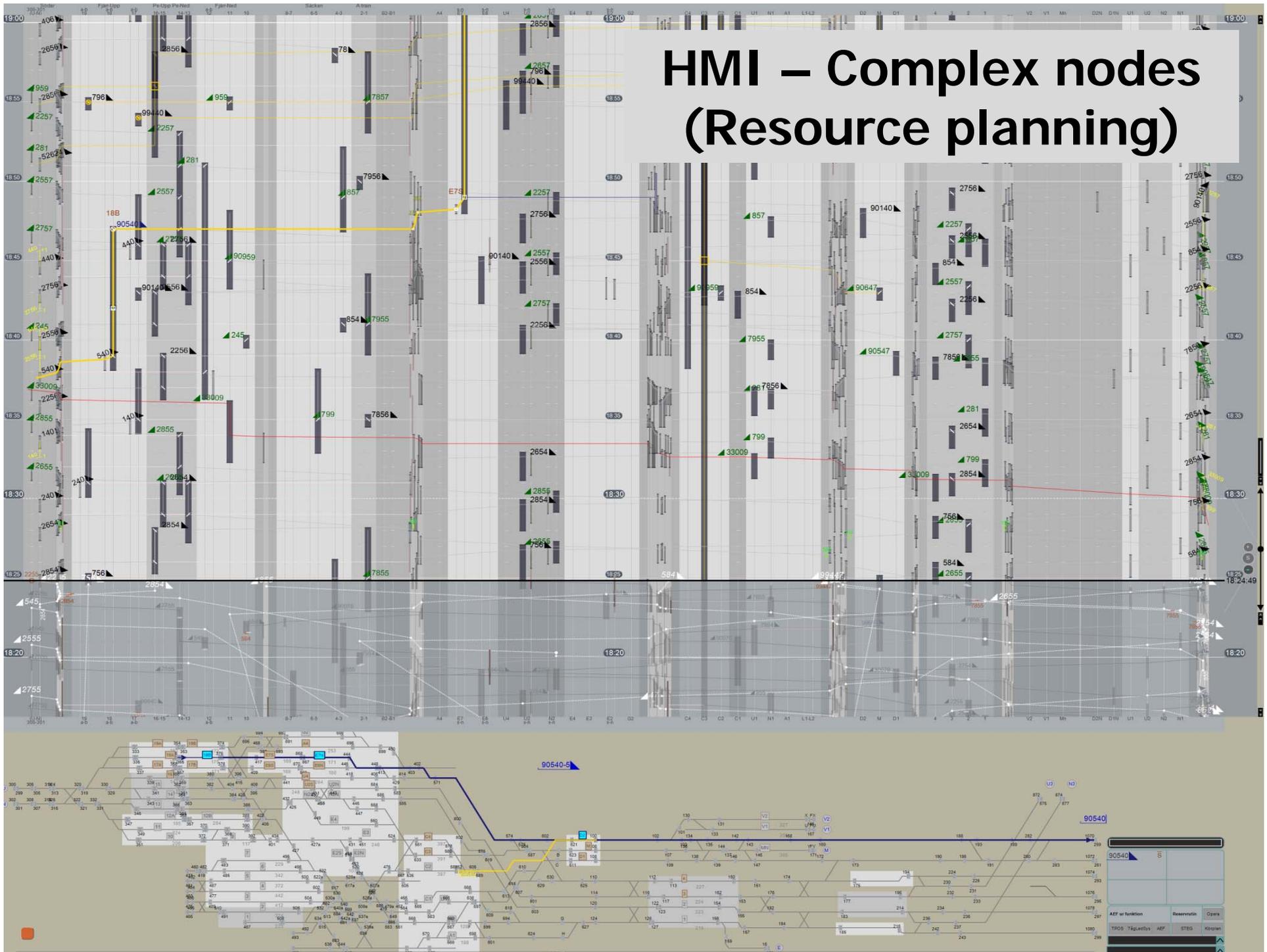


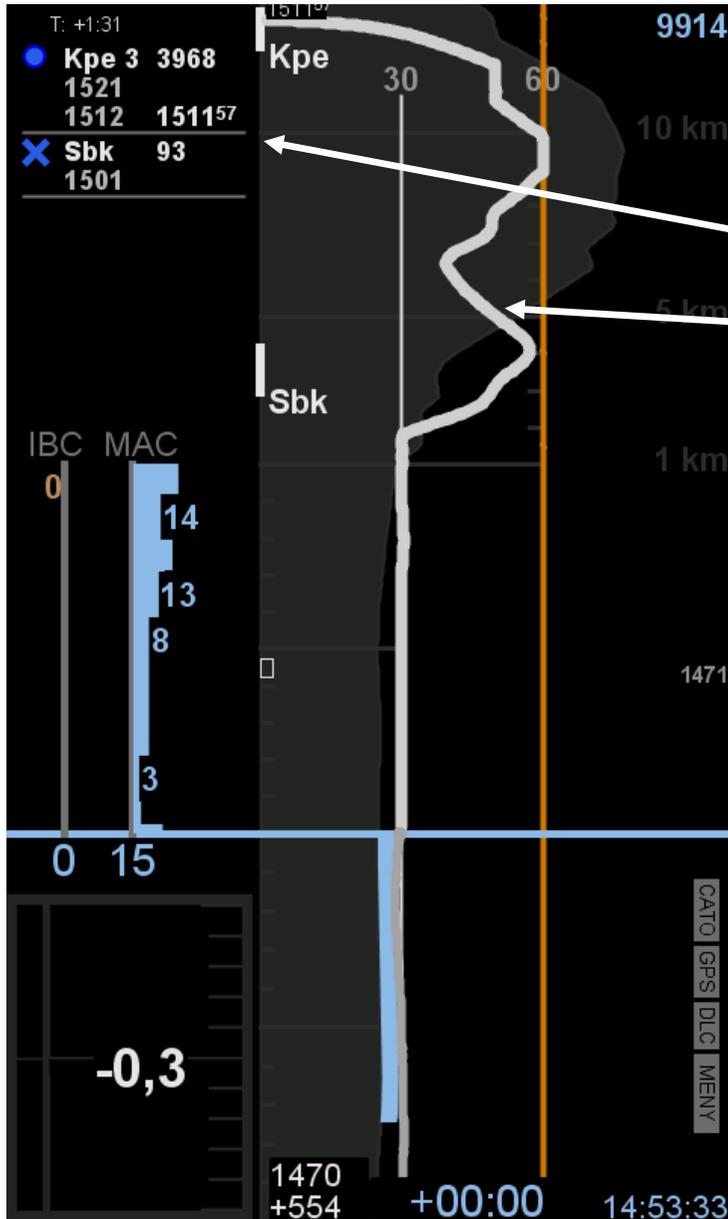
## STEG - principle

- Traffic control by operational re-planning
- A continuously updated RTTP
- Re-planning directly in the TC's HMI
- Automatic execution of the RTTP
  - non-autonomous automation, fully predictable
  
- CATO – DAS on the iron ore trains
  - Target points calculated from the RTTP
  - Reports back if target cannot be reached



# HMI – Complex nodes (Resource planning)





## The CATO HMI

Target points  
Speed profile

Supports driving according to the calculated speed profile, for punctuality and energy saving. Based on the STEG RTTP.

## Evaluation – future development

- STEG is used for operational control in Boden
- CATO is installed on all iron ore trains
- Evaluation
  - Technical problems of different nature still exist
  - The systems are used, but not to full extent
  - Potential benefits are verified, but not fully reached
  - Ongoing development to make the systems complete
- Future development
  - A new national TCS is now being developed, based on STEG
  - Continuous research and development
    - Decision support, DAS, complex nodes, simulators.....