The interplay between human and system as a critical success factor in the experiments of ATO over a class B system

Vera Verstappen & Mark van Dooren – Dutch Railways
The interplay between human and system as a critical success factor in the experiments of ATO over a class B system

Vera Verstappen & Mark van Dooren
Dutch Railways (Nederlandse Spoorwegen)
Vera Verstappen, Senior Human Factors Specialist at Dutch Railways
• Programme Human Factors/HMI@NS
• Programme ATO@NS
• Programme C-DAS (Driver Advisory System)

Mark van Dooren, Senior operational ERTMS expert at Dutch Railways
• Programme ERTMS@NS
• Programme ATO@NS
• Dutch national ERTMS programme
Challenges of ATO experiments at Dutch Railways

Challenges
- Transition to automation
- Capacity
- Flexibility
- Energy efficiency

Aim of ATO@NS
- GoA2 experiments
- Develop knowledge and skills
- Optimal use of learning potential
- Changing role train driver
- Develop Human Machine Interface for ATO performance

Developments we see
- Passengers (and their requirements) change
- Accessibility of The Netherlands is under pressure
- New forms and suppliers of mobility
- Climate goals, energy transition, housing shortage
- Technological innovations develop rapidly
- Plenty opportunities for public transport
Human Factors challenges in ATO experiments

Human Factors research questions

- Which interplay arises between human and technology?
- Which human factors aspects should be further studied and integrated in the ATO design?
- How to design the interplay between train driver and ATO to achieve optimal performance?

Challenges ATO over Class B

- Communication between ATO and train driver
- Joint situation awareness
- Trust and acceptance
- More driver – ATO interaction compared with ATO over ETCS
Automation philosophy & Human Factors approach @ NS

Philosophy
- Classic left-over principle
- Joint cognitive system of human and ATO

Phase 1 - ETCS: Left-over principle
- Camera & observations
- Driver journey reconstruction
- Debriefings with drivers
- Live experiments during test runs
- Human factors themes identified
Human Machine Interaction Design ATO over Class B

Phase 2 – Class B system: Joint cognitive system driver & ATO
Benefits & Conclusions

Involve human factors from the start in the development of ATO to achieve optimal performance by the driver and automated system

Benefits:

- Effective design process, resulting in an intuitive DMI based on the drivers' needs
- Optimal interplay between driver and ATO: Interaction between driver and ATO is intuitive and driver is prepared for new monitoring task
- Driver acceptance and trust in ATO

Set-up for success
By creating the right conditions from the start, ATO and driver can achieve the desired performance together
Thank you for your attention!

Questions?

Vera.Verstappen@ns.nl
Mark.vanDooren@ns.nl
Making the railway system work better for society.

Follow us on  

Discover our job opportunities on era.europa.eu