



Dedicated to innovation in aerospace

Human Factors solutions for rail

PRODUCTS & SERVICES



Human Factors methodologies established in aviation can be applied for train drivers and signallers

Imagine you want to introduce a change like introducing a new tool, technology, procedure or an entire new working environment for train drivers or signallers. Then you may be interested in the impact that this change will have on the operators. NLR can support you by assessing that impact. For example in terms of (mental)workload, impact on (loss of) attention, usability, stress, or fatigue.



WHAT YOU NEED

Knowledge about:

- The effectiveness of train drivers or signallers;
- Understanding when and how their workload is affected;
- When they are able to optimally concentrate on their job;
- When their attention may be diverted is relevant for numerous reasons.

Questions that remain: Are operators indeed able to perform effectively, or should the information presentation be adjusted for an optimally safe, energy efficient, punctual, smooth, and resilient operation?

WHAT WE DELIVER

NLR has Human Factors expertise, developed in the domain of aviation. NLR has found that there are many communalities between pilots and train drivers and also between air traffic controllers and signallers. The same research methodologies can be applied. NLR can offer these – in aviation – proven techniques to the rail domain.

OUR CAPABILITIES

NLR's methodology comprises human-in-the-loop experiments executed in a controlled environment, or in situ, to study the behaviour of train drivers or signallers. To ensure solid conclusions the so called methodological triangulation is applied. This method states that data from subjective sources should be compared with bio behavioural data and with performance of the operator. Only then, the impact of a certain change upon a train driver or signaller can be explained sufficiently. The methodology comes with a battery of tools and technologies.

To name a view:

- Task analyses to describe the job of train drivers and signallers in a structured way and to indicate exactly where a certain planned change might have impact
- Eye tracking to determine visual workload, fatigue or how attention is divided
- Heart rate to indicate mental workload or stress
- Rating scales and interview techniques to collect subjective data for additional interpretation of results
- Experimental design and statistical techniques to analyse data from different sources in a scientifically solid manner
- The use of simulation for a controlled environment to study behaviour of train drivers or signallers.

So far subsets of these techniques were applied in a number projects.

Some examples are:

- Impact of new tools in the cabin of the train on train driver behaviour
- Impact on train drivers behaviour of removing a number of switches and increasing the speed in the approach towards a railroad station
- Eye scanning behaviour of train drivers while approaching a complex portal sign with a history of stop signal passages
- New working procedures for signallers.



PRODUCTS & FEATURES

We deliver qualitative and quantitative evidence about whether a foreseen change (new technology, procedure, etcetera) has impact on the behaviour of train drivers or signallers. This knowledge enables you to make an informed decision about whether a planned change has added value and impact on efficiency or eventually on safety.