

European Driver's Desk field tests under "real life" conditions

Human Factors Working Group
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Even nowadays in a unified Europe with advanced liberalization of the rail transport sector and high competition from other modes, several technical and organisational barriers still hamper the rail traffic crossing the network borders of European rail operators. Due to different operation regulations and different historical developments the driver's desks differ in arrangement, functionality and in operation "philosophy".

For this reason three EC financed projects namely EUDD (European Drivers Desk), MODTRAIN/EUCAB and EUDDplus were initiated in sequence with the aim to strengthen the competitiveness of the European rail system by the development of a new unified and modular driver's desk for heavy rail vehicles.

Project history

European Driver's Desk (EUDD)
01/2001 - 12/2003 (EU project, FP 5)
→ Analyses and Measurements, definition of functions and their realisation, Functional demonstrator

MODTRAIN/EUCAB
02/2004 - 04/2008 (EU project, FP 6)
→ Enhanced functional modularisation: shift from controls to displays
→ **Functional cab demonstrator tested in virtual reality at SIMUFER, Lille**

EUDDplus www.euddplus.eu
07/2006 - 01/2010 (EU project, FP 6)
→ Field tests on an Alstom platform at Siemens Test Center Wildenrath/Germany
→ **To achieve a reduction of Life Cycle Costs of at least 15%**
→ **To justify the ergonomic advantages of the EUDD desk layout**
→ **To facilitate the future series homologation procedure for all European networks**

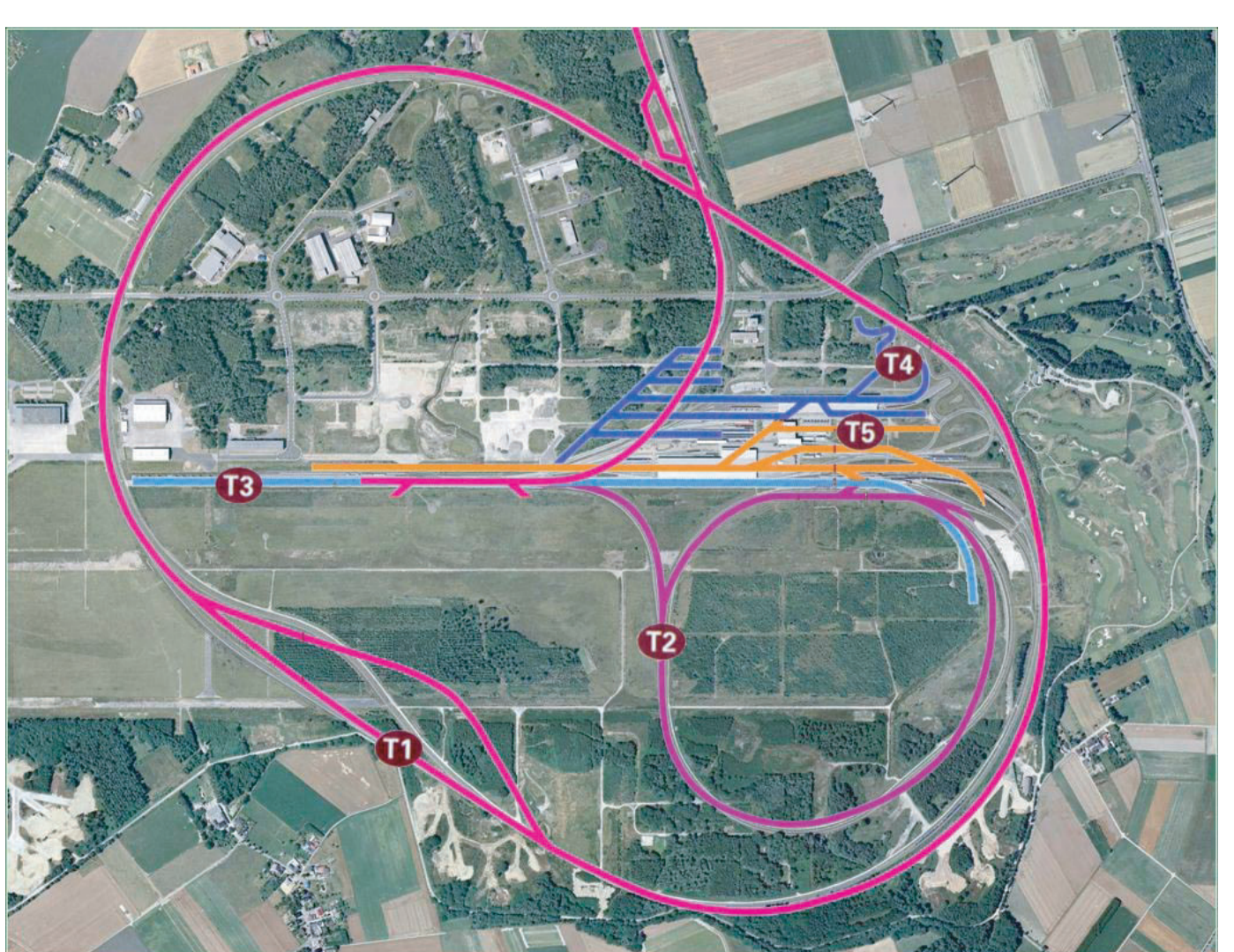
The input from the rail operators into EUDD and MODTRAIN led ultimately to the development of Operator Requirement Specifications (ORS) and to the UIC 612 leaflet, where the functional specifications of the Hardware MMI and the standardised display informations are defined.

The interactions between the driver and the new software functions implemented on the locomotive will be tested to determine if they increase the usability of the desk. The goal is to reduce the hardware controls (push buttons, levers, toggle and turn switches) of about 30% without any increase to the stress and strain situation of the driver.

Human Factors evaluation: 20 days/20 drivers from 10 European countries

Definition of the scenarios: base of the data collection

Five different scenarios were designed to maximise the "interaction" of the driver with the desk and to define reproducible driving situations



Test tracks of Wildenrath: 2 rings + 3 straight lines

Evaluation methods

Questionnaires about hardware controls (perceptibility, reachability and usability) and software ergonomie.

Rating scale for stress and strain before and after every test scenario, to measure the mental effort and assess how demanding in terms of cognitive resources the operation with the new driver's desk is.

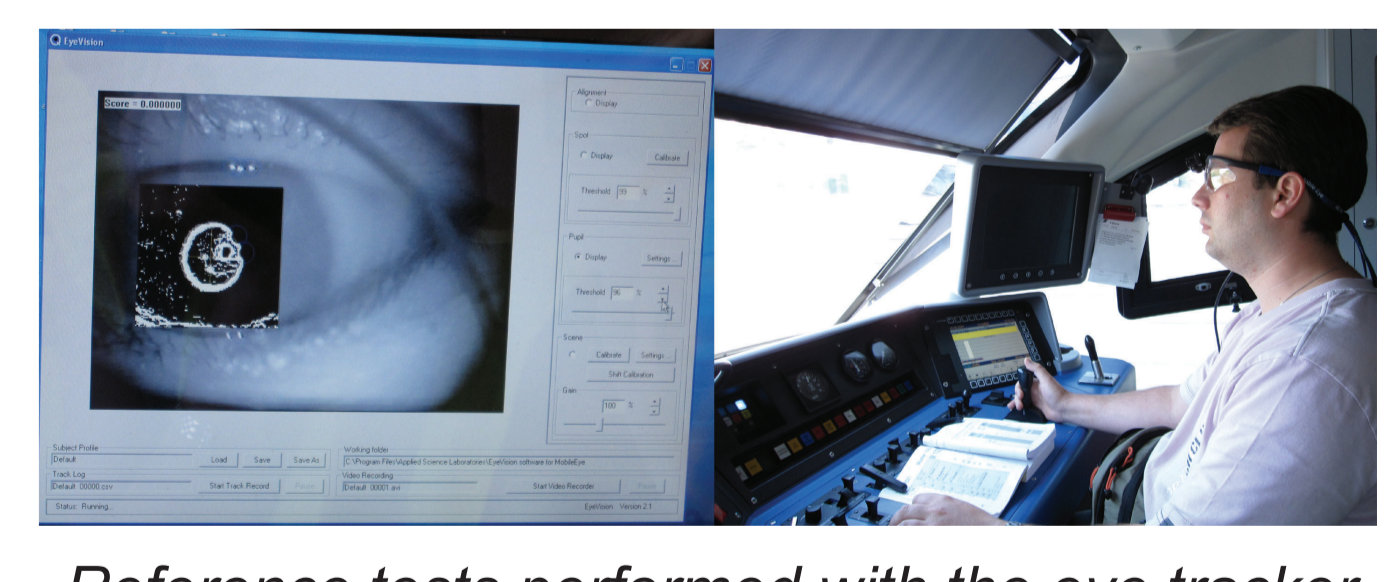
Structured interviews after the test day, to improve the interpretation of the results.

Measurements

Registration of the drivers' **eye movements** with a mobile system.

Measurements of luminance in the driver's cab with a video assisted measuring system to determine the contrast situation.

Technical data: all operations at the driver's desk will be registred by a computer



Reference tests performed with the eye tracker



Contrast situation during daylight and in the night