

## High Speed Train Driving Situation Awareness: An account of Attention and Perception in support of a new cab interface Design

### Institution:

Brunel University

### Supervisor:

Dr Mark Young

### Researcher: Denis Grenier

### Background:

The advent of ERTMS (European Rail Traffic Management System) is pushing towards a greater interoperability between networks as well as a greater capacity increase for the existing railways. It is in this context, on top of many other important agenda that UK Network Rail has to think how to implement such a novel change. It is not only the job that is changing but also the culture of the railways need to change.

For UK it is not an easy task compared to some of its continental partners such as France and Germany to name a few. That is why Human Factors have a key role to play in this European adventure not only this time in looking at a well established landscape but more likely proposing and implementing new strategies in the field to serve the railways of the 21<sup>st</sup> century. The further integration of national railways networks into a pan-european high speed network is there to stay on the agenda and will require from the UK and its governments the necessary investments and decision making .

### Method:

It seemed appropriate in order to be able to design a proficient system to focus at large on the human factors issue at stake as well as not to lose our design goals and aims. That is why it was more than relevant to address the issues of High Speed Train Driving through the spotlight of Attentional and perceptual theories in order to establish a model taking them into account and studying their respective role on a par with Situation Awareness (SA). In this perspective Perception is mainly studied from an Ecological point of view (Chemero, Gibson, Vicente) in order to circumscribe the environmental vision to be taken into account by the future SA model .

The question of Attention which precedes it is focusing on the binding of features (Duncan, LaBerge, Treisman),

The second step of the study to do not forget our design aims is to complete our appraisal of the question by field and ethnographic trips on top of perceptual and attention testing.

Finally the design of a full simulator mock-up would come in order to validate the theoretical findings of the Research

### Contact:

**Name:** Denis Grenier  
**E-mail:** mepgdpg@brunel.ac.uk

**Tel:** 07974553415

### Mailing Address:

Dept of Engineering  
Design, Bit Lab  
Brunel University,  
Uxbridge  
Middlesex UB8 3 PH



### Progress:

The first phase of the fundamental Research consisted essentially in a literature review of human factors disciplines related to the topic of Situation Awareness (Endsley), mental models (Johnson -Laird) as well as the more general approach of Social cognitive systems

The final step of this first and completed phase was to establish an overview of the questions of Attention and Perception as well as of the state of the art of Situation Awareness.

Work in progress consists in the development of appropriate material for laboratory experiments on Attention following guidelines from experts in the field prior to field trips and ethnographic studies to corroborate Ecological Perception fundamental Research as well as to confirm or infirm assumptions relative to experimental new Situation Awareness model.

Following completion of these early stages studies should progress in line with the aims to study the possibility to concretise the main study findings in order to carry on issuing design recommendations for future interfaces as well as designing a system mock-up able to be further developed and amended in the future



*Prospective early development DMI interface for ERTMS equipped UK HST power units*