

# **Project proposal**

## **SOFID**

### **Sorting Out of the Flow of Information by the Driver**

#### **Context**

Despite the efforts made in the design of new technical systems (ETCS, new drivers' cabs, radios, etc.), technological progress has changed the relationship between driver and information on board the train.

For example:

- motive power units have increasingly complex Man-Machine Interfaces,
- some technological processes result in complex tasks being carried out more or less without the knowledge of the driver,
- drivers receive increasing amounts of information in different formats (e.g. TCMS: Train Control Monitoring System).

This does not facilitate the interaction between these new technologies and the actions performed by a driver during disrupted situations.

To this should be added the challenges of interoperability and job mobility, which bring the 21st century European train driver face-to-face with a multiplicity of safety systems, signalling, languages and cultures.

These recent developments sometimes force train drivers to adopt new driving strategies which need to be better integrated into train driving.

Likewise, new technologies which increasingly involve the use of simulators and computer-assisted training should be focused on the critical functions performed by drivers when interacting with their environment.

All of these technical developments, which are inherent to the changing job of a 'modern' train driver, must not neglect the need to give a central role to the activity of train driving in the design of new driving equipment, taking account of the actions to be performed and the cognitive processes used whilst driving (attention, memory, etc.) as well as acknowledging the behavioural and cognitive differences between drivers.

For example, information appearing at the wrong time (however useful it might be at other times) can overburden the driver.

Similarly, a lack of useful information can also be a burden on his concentration. It is then more difficult for the driver to prioritise the information necessary for him to drive the train, which could have serious safety consequences (SPADs, incidents, accidents).

#### **Objectives**

The principal objective of this study is to provide practical recommendations on train driving to assist in the development of rolling stock, drivers' aids, design of driver's tools, organisation of drivers' work, training, and all the cultural differences within the population of train drivers.

Implementing these recommendations will allow the driver to master streams of information and to optimise his performance, particularly in an interoperable situation.

## **Methodology**

Different players will act on different levels: the UIC Human Factors Competence Centre, the UIC's Safety, ERTMS and Technology & Research Platforms, European universities as well as railway operators.

The work will focus on driver feedback from their experiences in this area, as well as looking at existing documentation and studies carried out on the subject.

Our work will also be based on:

- Interviews with and observation of drivers
- Observation of simulator tests
- Analysis of existing regulations
- Observation of train driving

This will be the basis for a "state of the art" description of train driving (in terms of managing the information destined for the driver) in order to categorise the different channels of information necessary for the driver.

## **Expected results - Deliverables**

- Information management guide taking drivers' behavioural and cognitive differences into account at a European level,
- Definition of requirements for
  - documents used by the driver: content, presentation,
  - oral and written communication,
  - equipment used (cab ergonomics, information support etc.),
- Proposals for changes to the TSIs, especially on aspects linked to driving,
- Guide to evaluate the adequacy of training (induction or further training) with regard to current drivers' or future drivers' needs (according to people and role),
- Proposed rules for controllable risk factors (driver mobility, drivers working for more than one employer, drugs and medication, number of systems and languages known to one driver, duration of the validity of evaluations according to their nature, competences held by drivers' managers, etc.),
- Proposals for a cooperative strategy between RUs and IMs (location of signals, knowledge of other professions with which operators have to cooperate, joint enquiries into incidents, joint audits or assessments, joint further training, etc.).

## **Description of working packages (draft)**

### **WP 1:**

This task will ensure a common understanding of the scope of the project, collect the information about the studies and researches that have been published until the start of this study, collect the information about the technical devices that are likely to be used in the future (either existing ones that should still be widely used in the near future or new ones still under development that seem likely to come to the market.)

### **WP 2:**

This task will aim at describing the tasks that the driver and his close environment has to perform in various cases, focusing on the situations most demanding in the field of gathering information, processing them and taking decisions and actions. The output should be a proper description of these situations, how they occur, how do the information reach the driver, what is expected from him, what are the possible malfunctioning or errors, what may lead to these malfunctions or errors, what are the possible consequences, etc

### **WP 3:**

This task will analyse the information and data processes carried out by a driver in the various systems, environments and situations. It will analyse the influence factors and performance shaping factors that lead to better or worse performance and the possible consequences.

### **WP 4:**

This task aims at drafting recommendations based on the analyses carried in the previous tasks. These recommendations will address: information flow management, design of the cab and the tools of the driver, design of the communications between the driver and the staff of the Infrastructure Management or the staff of his or another Railway undertaking, management of the emergency cases, etc...

### **WP 5:**

This task will draft the recommendations to adapt the management of the driver (training, checks, rewards and punishments, support from the managers, policy of the company, etc ) to the needs and principles of his tasks renewed according to the possibilities offered by the most modern devices and the implementations of the recommendations set by the previous tasks.

### **WP 6:**

Dissemination of the results ( UIC)

## Potential participants list

Here below the potential participants list established at 15 December 2007

Role	N°	Participant name	Participant short name	Country	Date enter project	Date exit project
CO	1	Union Internationale des Chemins de fer	UIC	FR	M1	M 36
CR	2	Deutsche Bahn	DB	DE	M1	M 36
CR	3	Société Nationale des Chemins de Fer Français	SNCF	FR	M1	M 36
CR	4	Trenitalia & RFI	TI - RFI	IT	M1	M 36
CR	5	Railways Safety and Standards Board	RSSB	UK	M1	M 36
CR	6	Southeastern Railways	SR	UK	M1	M 36
CR	7	Österreichische Bundesbahnen.....	ÖBB	AU	M1	M 36
CR	8	Société Nationale des Chemins de Fer Belges	SNCB	BE	M1	M 36
CR	9	CESKE DRAHY	CS	CK	M1	M 36
CR	10	Université Technique Belfort Montbéliard	UTBM	FR	M1	M 36
CR	11	Université PARIS V	Univ R Descartes	FR	M1	M 36
CR	12	ESM Research Institute	ESM	SP	M1	M 36
CR	12	ERGOLAN	ERGOLAN	SP	M1	M 36
CR	13	CARCERANO	CARCERANO	IT	M1	M 36
CR	14	University of Valencia	UV	SP	M1	M 36
CR	15	ALSTOM TRANSPORT	ALSTOM	FR	M 1	M 36
CR	16	BOMBARDIER TRANSPORTATION	BOMBARDIER	DE	M 1	M 36
CR	17	SIEMENS	SIEMENS	DE	M 1	M 36
CR	18	OKTAL	OKTAL	FR	M1	M 36
CR	19	ANSALDO BREDA	ANSALDO	IT	M1	M 36

\*CO = Coordinator  
CR = Contractor  
\*\* Normally insert “month 1 (start of project)” and “month n (end of project)”  
These columns are needed for possible later contract revisions caused by joining/leaving participant