

Helpdesk In addition to the human factor guidelines, a helpdesk has been created for private and public organisations who struggle with human factor questions in relation to in-car information services. See www.rondetafels.ditcm.eu/hb for more information on the helpdesk or send an email to behaviour@ditcm.eu.

This is an official publication of the
Smart Mobility Round Table Human Behaviour

More information:
<http://rondetafels.ditcm.eu/hb>
<http://rondetafels.ditcm.eu/international> (English)

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Human factor guidelines

for the design of safe in-car traffic information services

Traffic-related information services will be more often presented by individual means in vehicles ('in-car') and less by collective means on the road side (next or above roads).

Due to this trend, more and also different parties will provide traffic information services to the road user via in-car systems and mobile devices.

With guidelines for the design of safe in-car traffic information services the Dutch Smart Mobility Round Table Human Behaviour aims to support that in-car traffic service providers take into account the abilities and capabilities of the driver when developing these services. The effect of the services on the driver will largely depend on how road users respond to the information they are given, and therefore also on how these systems are designed and how the driver interacts with them.

The guideline gives practical support to:

- 1) designers who want to develop safe in-car traffic information services;
- 2) authorities who commission the development of traffic information services, in specifying tenders and checking project proposals.

The guideline is based on existing literature, European and global standards (such as ESoP and SAE), expert opinions, and consultations with relevant public and private organisations, both at the beginning of this project and at the stage of the concept guideline. This flyer provides a summary of the main criteria the guideline describes. These criteria are interdependent. That is, a bad performance on one criterion may be detrimental to the performance on other criteria and the overall service. Following that, it is not only important to design for the safe use of the service by the driver, but also to take the behaviour of other (non-equipped) road users into account.

The guideline is meant as a base for parties that want to deliver good services in respect to the shared collective aim of road safety. Although this guideline is not a formal regulation and is voluntary in use, several Dutch organisations – including industry, governments, and knowledge institutes who are organised in the Tactical Board of the Smart Mobility Round Tables – have expressed their commitment to use the guideline in their projects and products.

An advice or warning may seem in the best interest of the driver, but it could undermine traffic safety due to the (absent) reactions of other road users. It is important to realise that a traffic information service will operate in the complex and dynamic traffic environment.

If you wish to learn more about the human factor guidelines, their background, and practical examples, you can find the full version of the 'Human factor guidelines for the design of safe in-car traffic information services' at www.rondetafels.ditcm.eu/hb.

Together we can improve road safety by designing safer in-car traffic information services.

Human factor criteria

Additional workload

Limit additional workload.

- Information can be presented best when the workload of the primary task is low e.g. when driving on a quiet road with low traffic density and activity for a long time.
- In complex situations, depending on the complexity of the infrastructure, the traffic density, and the speed at which is being driven, information provided to the driver should be minimised; less urgent messages should be postponed.

Visual distraction

Visual distraction from the driving task should be avoided.

- Information should not lead to glances that exceed 2 seconds eyes off the road.
- Emotional content should be avoided.
- The display does not show more than 4 separate types of information units simultaneously in relation to an event, next to the continuously displayed navigation information.

Priority by context and urgency

Information is prioritised by its importance to the driver in relation to the context and urgency.

- Safety-related warnings have priority over non-safety-related information.
- Information that requires behavioural change has priority over information that does not.
- Information that is related to the manoeuvre or control level of the driving task has priority over information related to the navigation level of the driving task (see the full report for explanations on the three levels of the driving task).

Timely presentation

Information should be presented on time, not too late or too early.

- Information should be presented preferably about 36 seconds before the point of action or 200 m before the first road sign.
- Information should be presented at least 9 seconds before the point of action.
- Information which is always of (high) relevance to the driving task can best be displayed continuously at a fixed position on the screen.

Auditory distraction

Auditory distraction from the driving task should be avoided.

- Safety-related warnings should always be combined with an auditory attention cue.
- A 'neutral' sound should be used when warning for hazardous situations, rather than emotionally laden sounds.

Ambiguity, validity, and reliability

Information presented is unambiguous, valid, and reliable.

- Information presented should not be interpretable in multiple ways.
- The occurrence of false alarms and misses should be minimised to ensure reliable information.
- The content of the information should be relevant and in line with the traffic scenario at that moment in time to be valid.

Recognisability and consistency

Information should be recognisable and consistent with legal traffic signs and signals should not occur.

- The traffic information service should use the formal national signs and signals of the local country (no modifications).

Credibility, acceptance, and compliance

Information is credible and aims for high acceptance and compliance.

- Dynamic information provision such as a sudden speed limit change or closing of a traffic lane should be accompanied by an argument.
- Information should make sense given the situation and not conflict with perceived feasibility.

Physical interaction

Physical interaction with the information service should be minimised.

- The information service should not require any manual control input from the driver while driving.
- It should always be possible to turn off the application, to adjust the brightness of the screen and to turn the volume up/down. Furthermore, operating buttons should provide minimal visual distraction.
- The display should always be fixed to the car with a holder, preferably 10 to 20 cm within reach.

Negative side effects

The information service minimises negative side effects.

- An advice should not encourage speeding, and in particular, large speed differences between different drivers should be avoided (maximum 20km/h difference in operating speed).
- City centres, school areas and other safety critical areas should be avoided (unless they are the final destination).

Ergonomic aspects

The guidelines also describe the common ergonomic aspects such as legibility and audibility of the information.