INTERNATIONAL STANDARD



First edition 2002-07-01

Road vehicles — Ergonomic aspects of transport information and control systems — Dialogue management principles and compliance procedures

Véhicules routiers — Aspects ergonomiques des systèmes de commande iTeh Set d'information du transport — Principes de gestion du dialogue et essais de conformité (standards.iteh.ai)

ISO 15005:2002 https://standards.iteh.ai/catalog/standards/sist/24492600-4695-44b7-bea1ac911ba2069d/iso-15005-2002



Reference number ISO 15005:2002(E)

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Contents

Forewordiv		
Introdu	Introductionv	
1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Application	4
5 5.1	Dialogue principles General	4
5.2 5.2.1	Explanation of principle	5 5
5.2.2	Compatibility with driving	5
5.2.3 5.2.4	Simplicity Timing/priorities	6 7
5.3	Appropriate for the TICS task	9
5.3.1	Explanation of principle	9
5.3.2 5.3.3	Consistency	9
5.4	Appropriate for the driver	1
5.4.1	Explanation of principle	1
5.4.2	Self-descriptiveness	1
5.4.3 5.4.4	Error-tolerance https://standards.iteh.ai/catalog/standards/sist/24492600-4695-44b7-bea1-	2 2
Bibliog	ac911ba2069d/iso-15005-2002 praphy1	4

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15005 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 13, *Ergonomics applicable to road vehicles*.

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Introduction

This International Standard deals with the ergonomic design of transport information and control systems (TICS) and provides general ergonomic principles for their dialogues, independent of any specific dialogue techniques.

The utmost care needs to be taken in the design and installation of TICS equipment in order to ensure that it does not impair the driver's safe control of the vehicle. This is in recognition of the fact that the driving environment has variable conditions, such as road surface, visibility, weather, ambient lighting and traffic conditions.

Dialogue management principles for TICSs are characterized by the need to take into account the following:

- TICSs are intended for use in a moving vehicle;
- TICSs help functions need to be appropriate to a moving vehicle;
- TICS dialogues take place in a constantly changing vehicle environment;
- TICS technologies need to be suited to that environment;
- TICS dialogues include the driver's vehicle-control actions in response to the TICS.

The driver of a vehicle equipped with a TICS device is responsible for the safety of the vehicle, its occupants and other road users. A dialogue therefore needs to take into account the driver workload as a whole, including the cognitive, perceptual and physical tasks associated with driving, so that there will be no impairment of the safe and effective operation of the vehicle. An important objective is to ensure effective and efficient TICS operation while respecting the in-vehicle environment and recognizing the paramount importance of the primary driving task.

https://standards.iteh.ai/catalog/standards/sist/24492600-4695-44b7-bea1-In addition to the recommendations and requirements related to the principles it presents, ISO 15005 also gives the conditions for compliance. As the manner in which each dialogue principle is applied will depend on the particular characteristics of the TICS function and the specific dialogue technique used, application examples have been provided.

The ultimate beneficiary of this International Standard will be the TICS end-user: the driver of the road vehicle. It is the needs of the driver that have determined the ergonomic requirements included by the developers of ISO 15005.

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Road vehicles — Ergonomic aspects of transport information and control systems — Dialogue management principles and compliance procedures

1 Scope

This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.

This International Standard is applicable to TICS consisting of either single or multiple devices, which can be either independent or interconnected. It is not applicable to TICS without dialogues, TICS failures or malfunctions, or controls or displays used for non-TICS functions.

The requirements and recommendations of this International Standard could need to be reconsidered for drivers with special needs.

2 Normative references 11eh STANDARD PREVIEW

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards 5005-2002

ISO 3958, Passenger cars — Driver hand-control reach

ISO 15008¹⁾, Road vehicles — Ergonomic aspects of transport information and control systems — Specifications and compliance procedures for in-vehicle visual presentation

SAE²⁾ J1050, Describing and measuring the driver's field of view

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1

communication

exchange or transfer of information

3.2

control

part of an item of equipment used by a human operator to bring about a change in the performance of the equipment

¹⁾ To be published.

²⁾ US society of automotive engineers.

3.2.1

primary control

device used by a driver to control longitudinal and lateral motion of a vehicle

EXAMPLE Steering wheel, brake pedal, accelerator, gear selector or clutch.

3.2.2

secondary control

non-primary device used by the driver to control mandatory functions

EXAMPLE Parking brake, horn, light switches, turn indicator control, washer and wiper controls, hazard flasher control or demister control.

3.3

control action

configuration or adjustment of a control that causes a specific piece of information to be input to the system

3.4

data entry

act of providing the information that the selected function requires to be able to perform in a desired way

3.5

dialogue

exchange of information between a driver and a system, instigated by either one, to achieve a particular goal, consisting of a related sequence of control actions that can involve more than one modality

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3.6 dialogue effectiveness

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successful exchange of the required information between the system and the user

3.7

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dialogue efficiency https://standards.iteh.ai/catalog/standards/sist/24492600-4695-44b7-bea1-

effective exchange of information performed with little demand on the user in terms of information gathering (e.g. reading, listening), or information processing and information input (e.g. control actions)

3.8

dialogue management

control of the exchange of dynamic information between a driver and a TICS, organized and displayed through any type of interface

3.9

display

device that allows the presentation of visual, auditory or tactile dynamic information to a driver

3.10

distraction

significant capture of driver attention by stimulations from non-driving-related information or from driving-related information presented in such a way that the stimulation attracts more driver attention than necessary to obtain the relevant information

3.11

driver

vehicle occupant in control of the vehicle

3.12

dwell time

sum of consecutive individual fixation and saccade times to a target in a single glance

[ISO 15007-1:2002, definition 3.5]

3.13

function

transformation of incoming information into outgoing results

3.14

H-point

pivot centre of the torso and thigh of the three-dimensional H-point machine which simulates the pivot centre of the human torso and thigh and is used for actual H-point determination

NOTE It is located on the centreplane of the device which is midway between the H-point sight buttons on either side of the H-point machine.

[ISO 6549:1999, definition 3.2]

3.15

interface

physical facility (or hardware) between driver and system that provides the media through which they can connect and interact

3.16

manufacturer

person or organization responsible for TICS operational characteristics

The term covers the designer, component supplier and system integrator, and also system suppliers who, by putting NOTE a name, trademark or other distinguishing feature on a product, present themselves as its producer.

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3.17 primary driving task

primary driving task activities that the driver has to undertake in navigating, manoeuvring and handling a vehicle

ISO 15005:2002 **EXAMPLE** Steering, braking or accelerating.

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3.18 prompt

indication that the system is available to receive input

3.19

sensory mode

perceptual medium used for information transmission or reception (auditory, visual, tactile, etc.)

3.20

status

current available or active system mode(s), or both, of the TICS

3.21

system acknowledgement

information provided to the driver by the system in response to a driver request

3.22

system initiated information

information provided to the driver by the system, other than in response to a driver request

3.23

system mode

specified subset of system functions or behaviour patterns

3.24

task

work performed to accomplish a set goal or end state sought by a driver

3.25

transport information and control system

TICS

single function, such as route guidance, or number of functions designed to work together as a system

See ISO/TR 14813-1 for TICS services.

3.26

timing

temporal relationship between display presentations and control actions, other presentations, system changes, the road or traffic situation, and driving

3.27

traffic situation relevant information

information received via communication channels, such as broadcasting receivers and on-board sensors, where the driver has no control over the time of reception

EXAMPLE Traffic information, route guidance information or collision warning.

3.28

vehicle in motion

vehicle whose speed relative to its supporting surface is "nonzero"

NOTE Practical limitations on existing vehicle sensors may cause small velocities (typically \leq 5 km/h) to be registered as zero.

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3.29

otion (standards.iteh.ai)

vehicle not in motion (standards) vehicle whose speed relative to its supporting surface is zero

NOTE Practical limitations on existing vehicle sensors may cause small velocities (typically \leq 5 km/h) to be registered as ac911ba2069d/iso-15005-2002

4 Application

The ergonomic principles for TICS dialogues given in clause 5 are to be applied within the context to which they are relevant, for example, for particular TICS functions and input/output technologies. The principles take into account a range of user characteristics. Therefore, the application of this International Standard to a specific TICS function should take into account the characteristics of the target user population.

If controls or displays or both are used for non-TICS functions, these functionalities are excluded from the provisions of this International Standard.

5 Dialogue principles

5.1 General

The following principles have been identified as being important in the design and evaluation of a TICS dialogue.

- a) Appropriate for use while driving:
 - compatibility with driving;
 - simplicity;
 - timing/priorities.

- b) Appropriate for the TICS task:
 - consistency;
 - controllability.
- c) Appropriate for the driver:
 - self-descriptiveness;
 - conformity with driver expectations;
 - error tolerance.

These dialogue principles are explained, and the related requirements and recommendations are given, together with examples demonstrating how the principles can be applied. Wherever there are requirements, compliance verification conditions for these are also given.

5.2 Appropriate for use while driving

5.2.1 Explanation of principle

A TICS dialogue is appropriate for use while driving to the extent that it recognizes the paramount importance of the driving task, the driver's need to respond to stimuli from the traffic environment and, where applicable, from TICS that enhance the driving task. STANDARD PREVIEW

5.2.2 Compatibility with driving

5.2.2.1 Explanation of principle

ISO 15005:2002

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A TICS dialogue is compatible with driving when the use of the TICS dialogue is compatible with driving when the use of the TICS dialogue is compatible with driving when the use of the TICS dialogue is compatible to control the vehicle 2069d/iso-15005-2002

5.2.2.2 Requirements

5.2.2.2.1 Whenever a TICS provides inputs to either the primary driving controls or secondary controls, or both, the vehicle's response to driver operation of these controls shall not be adversely affected.

EXAMPLE 1 The driver will be able to override an ACC function by application of the service brake or accelerator.

EXAMPLE 2 The driver's input or braking force will be modified or improved for collision avoidance purposes.

A TICS is in compliance with this requirement if

- a) the TICS has no connection to, or interaction with, either the primary or secondary driving controls or both, or
- b) the TICS does have such a connection or interaction, but the driver's operations always override the TICS operation.

5.2.2.2.2 TICS dialogues shall not require removal of both hands from the steering wheel while driving.

EXAMPLE Hand-held TICS equipment requiring two hands for operation will not be designed for use while driving.

A TICS is in compliance with this requirement if it is possible for a driver to perform all TICS control actions while keeping at least one hand on the steering wheel.