SLOVENSKI STANDARD
oSIST prEN ISO 9241-960:2015
01-oktober-2015

Ergonomija medsebojnega vpliva človek-sistem - 960. del: Okvir in navodila za interakcijo kretenj (ISO/DIS 9241-960:2015)

Ergonomics of human-system interaction - Part 960: Framework and guidance for gesture interactions (ISO/DIS 9241-960:2015)

Ergonomie der Mensch-System-Interaktion - Teil 960: Rahmen und Anleitung zur Gestensteuerung (ISO/DIS 9241-960:2015)

Ergonomie de l'interaction homme-système - Partie 960: Cadre et lignes directrices relatives aux interactions gestuelles (ISO/DIS 9241-960:2015)

Ta slovenski standard je istoveten z: **prEN ISO 9241-960**

ICS:

13.180	Ergonomija	Ergonomics
35.180	Terminalska in druga periferna oprema IT	IT Terminal and other peripheral equipment

oSIST prEN ISO 9241-960:2015 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 9241-960

ISO/TC **159**/SC **4** Secretariat: **BSI**

Voting begins on: **2015-08-06**

Voting terminates on: **2015-11-06**

Ergonomics of human-system interaction —

Part 960: Framework and guidance for gesture interactions

Ergonomie de l'interaction homme-système —

Partie 960: Cadre et lignes directrices relatives aux interactions gestuelles

ICS: 13.180; 35.180

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Reference number
ISO/DIS 9241-960:2015(E)

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Published in Switzerland

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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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9241-960 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-computer interaction*.

ISO 9241 consists of the following parts, under the general title *Ergonomic requirements for office work with visual display terminals (VDTs)*:

- Part 1: General introduction
- Part 2: Guidance on task requirements
- Part 3: Visual display requirements
- Part 4: Keyboard requirements
- Part 5: Workstation layout and postural requirements
- Part 6: Guidance on the work environment
- Part 7: Requirements for display with reflections
- Part 8: Requirements for displayed colours
- Part 9: Requirements for non-keyboard input devices
- Part 11: Guidance on usability
- Part 12: Presentation of information
- Part 13: User guidance
- Part 14: Menu dialogues
- Part 15: Command dialogues
- Part 16: Direct manipulation dialogues

— Part 17: Form filling dialogues

ISO 9241 also consists of the following parts, under the general title *Ergonomics of human-system interaction*:

— Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services

— Part 110: Dialogue principles

— Part 151: Guidance on World Wide Web user interfaces

— Part 171: Guidance on software accessibility

— Part 300: Introduction to requirements and measurement techniques for electronic visual displays

— Part 302: Terminology for electronic visual displays

— Part 303: Requirements for electronic visual displays

— Part 304: User performance test methods

— Part 305: Optical laboratory test methods for electronic visual displays

— Part 306: Field assessment methods for electronic visual displays

— Part 307: Analysis and compliance test methods for electronic visual displays

— Part 309 (TR): Organic light-emitting diode (OLED) displays

— Part 310 (TR): Visibility, aesthetics and ergonomics of pixel defects

— Part 400: Principles and requirements for physical input devices

— Part 410: Design criteria for products for physical input devices

— Part 910: Framework for tactile and haptic interaction

— Part 920: Guidance on haptic and tactile interactions

The following parts, under the general title *Ergonomics of human-system interaction*, are under preparation:

— Part 308: Surface-conduction electron-emitter displays (SED) [Technical Report]

— Part 411: Laboratory test and evaluation methods for the design of physical input devices

— Part 420: Selection procedures for physical input devices

— Part 421: Workplace test and evaluation methods for physical input devices

— Part 940: Evaluation of tactile and haptic interactions

Introduction

Tactile and haptic interactions are becoming increasingly important as candidate interaction modalities in computer systems such as special purpose computing environments (e.g. tablets), wearable technology (e.g. tactile arrays, instrumented gloves), and assistive technologies.

Tactile and haptic devices are being developed in university and industrial laboratories in many countries. Both the developer and the prospective purchaser of such devices need a means of making comparisons between competing devices and common design of interactions.

This standard, ISO 9241-960, focuses on gestures and identification of gesture sets as a specific type of tactile/haptic interaction. It explains how to describe their features, and what factors to take into account when defining gestures.

ISO 9241-910 provides a common set of terms, definitions, and descriptions of the various concepts central to designing and using tactile/haptic interactions. It also provides an overview of the range of tactile/haptic applications, objects, attributes, and interactions.

ISO 9241-920 provides basic guidance (including references to related standards) in the design of tactile/haptic interactions.

ISO 9241-940 is under preparation and provides ways of evaluating tactile/haptic interactions for various aspects of interaction quality (such as haptic device attributes, logical space design and usability).

Ergonomics of human-computer interaction — Part 960: Gestures in tactile and haptic interactions

1 Scope

Selection or creation of the gestures to be used in a gesture interface is guided by this standard. It addresses the usability of gestures and provides information on their design - the design process and relevant parameters that should be considered. In addition, the standard provides guidance on how gestures should be documented. The standard is concerned with gestures expressed by a human and is not concerned with the system response generated when users are performing these gestures.

NOTE 1 Specific gestures are standardized within ISO/IEC 14754 and the ISO/IEC 30113 series.

NOTE 2 Input devices such as tablets or spatial gesture recognition devices can capture gestures in 2D or 3D. All human gestures are 3D.

2 Terms and definitions

Definitions of ISO 9241-910, “Ergonomics of human-system interactions – Framework for tactile and haptic interactions”, apply. For the purpose of this document, the following terms and definitions also apply:

2.1
feedforward gesture information
information provided by the gesture interface to maintain consistency of a body part’s movement with predicted single or multiple gesture trajectories

NOTE Feedforward gestural information improves self-explanation of the gestural interface.

EXAMPLE A gesture might be visualized through inking the trajectory on the display. Several choices of possible future trajectories can be inked, thereby helping the user to complete the gesture.

2.2
gesture
movement or posture, of the whole body or parts of the body

NOTE Operation of a physical keyboard is not addressed in this document

[ISO/IEC 30113-1, 3.1]

2.3
gesture command
instruction to the system resulting from a gesture input by the user, e.g. Select, Move, Delete

[ISO/IEC 14574:1999, 4.5]

2.4
gesture interface
user interface that provides information and controls for a user to accomplish specific tasks with the interactive system by his/her gestures

NOTE Adapted from ISO 9241-171: definition 3.29.

2.5
gesture set
grouping of gestures and their mapping to gesture commands

EXAMPLE The conductor of a virtual orchestra uses a gesture set for a music performance.

2.6
intentional gesture
movement of the body or parts of the body to achieve a purpose

2.7
stroke gesture
gesture consisting of a movement trajectory of one or more fingers with or without holding a pointing device, including single or multiple touches of a surface

3 General introduction

3.1 Need for a standard on gesture usability

When pointing devices such as the mouse were developed in the 1960s, movement of the human hand became part of interactive systems. It took until the mid-1980s for the mouse to become standard in the office context. With the advent of multi-touch displays and 3D cameras, gestures appear to be a highly usable alternative to a tiny keyboard on a mobile device. The ubiquity of gestural interfaces makes it important to consider their usability.

3.2 Usage

Gestures may accompany language in order to strengthen what has been said. Such gestures are described in linguistics as "deixis" (pronounced "dīk-sis" or "dāk-sis"). The term "deixis" refers to words such as in "Put that there" which require contextual information provided by pointing in order to be fully understood. Gestures may convey their own meaning inherent to the actual movement of some body part and independent of some tangible physical object such as a pen or mouse. When using a pointing device while gesturing, the Information and Communication Technology (ICT) system often restricts the movements according to the ability of the device to detect movements. Gestures, like language, are culture-specific and misunderstandings may arise from inappropriate use of them.

3.3 Intentional and unintentional gestures

In designing gesture sets, emphasis is often placed on adopting gestures that are intentional or unintentional with respect to the system. A typical example of an intentional gesture is pointing at an object in order to select it, or waving your hand in front of a door to open it. Unintentional gestures in this context are gestures made for some other purpose (eg. walking towards an automatic door, sitting down in the driver seat of a car), or gestures made subconsciously (eg. body language). Such unintentional learnable gestures are particularly suited to general situations where the user might not be trained, when the user must learn the system quickly, or when the user must use the system under conditions of stress (e.g., time pressure).

Intentionality in gestures could also enable increased discriminability between them, thereby reducing inadvertent activation. For example, when it is desired not to activate an automatic door, many people stand still and avoid gesturing in front of the doors, knowing they are prone to open unintentionally.

3.4 Matching gestures and functionality

A gesture is the result of the user’s intention to create a message for a recipient or computer while mapping it to the movement of the body or parts of the body, typically the upper limbs. Figure 1 illustrates variations of the intention applicable when gestures are expressed to an ICT system. The user on the left is interacting with a gesture interface on the right, using a selection of gestures from a gesture set. The user has an intention to transmit, and can make use of posture and movement. His choice of gestures may be intentional, or unintentional, depending on the situation. The gesture interface could provide feedback on the system's