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Ergonomics of human-system interaction —

Part 411: Evaluation methods for the design of physical input devices

Ergonomie de l'interaction homme-système —

Partie 411: Méthodes d'évaluation de la conception des dispositifs d'entrée physiques

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Contents

Page

Foreword v
Introduction viii
1 Scope 1
2 Normative references 1
3 Terms and definitions 2
4 Guiding principles 7
5 Evaluation methods 7
5.1 Physical input devices in general 7
5.2 Keyboards 10
5.3 Mice 22
5.4 Pucks 25
5.5 Joysticks 28
5.6 Trackballs 31
5.7 Touchpads 34
5.8 Tablets and overlays 37
5.9 Styli and light-pens 40
5.10 Touch-sensitive screens 42
6 Conformance 42
Annex A (informative) Overview of the ISO 9241 series 43
Annex B (informative) Testing of efficiency and effectiveness 44
Annex C (informative) Assessment of comfort 51
Annex D (informative) Usability test for keyboards 56
Bibliography 62

Figures

Figure 1 — Side view of example joystick 3
Figure 2 — Example of light-pen against display 4
Figure 3 — Top view of example of tablet with graphic overlay 4
Figure 4 — Top view examples of two types of puck 5
Figure 5 — Side view of example of stylus over graphics tablet 5
Figure 6 — Example of top view of trackball device with buttons 6
Figure 7 — Illustration of flat, concave and convex keytops 14
Figure 8 — Measurement of keytop width and depth 14
Figure 9 — Measurement of key displacement 14
Figure 10 — Relationship between key displacement and key force (ISO 9241-410:2008, Figure B.3) 15
Figure 11 — Measurement of character height 15
Figure 12 — Measurement of vertical and horizontal distance between two adjacent keys 17
Figure 13 — Measurement of slope of keyboard 18
Figure 14 — Numeric keypad layout 18
Figure B.1 — Relationship of index of difficulty to time 47
Figure B.2 — One-direction tapping task 48

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Figure B.3 — Multi-directional pointing task 49
Figure B.4 — Tracing task 50

Tables

Table 1 — Measuring methods on physical input devices in general 7
Table 2 — Requirements on the generic operability of keyboards 10
Table 3 — Requirements for functional properties of full-size keyboards 10
Table 4 — Requirements for sections and zones of full-size keyboards 16
Table 5 — Requirements for the mechanical design of full-size keyboards 17
Table 6 — Requirements for maintainability of full-size keyboards 18
Table 7 — Requirements for documentation of full-size keyboards 19
Table 8 — Requirements for design of keys of compact keyboards 19
Table 9 — Requirements for sections and zones of compact keyboards 20
Table 10 — Requirements for mechanical design of compact keyboards 20
Table 11 — Requirements for maintainability of compact keyboards 21
Table 12 — Requirements for documentation of compact keyboards 22
Table 13 — Mouse design requirements 22
Table 14 — Design requirements for pucks 25
Table 15 — Design requirements for joysticks 28
Table 16 — Design requirements for trackballs 31
Table 17 — Design requirements for touchpads 34
Table 18 — Design requirements for tablets and overlays 37
Table 19 — Design requirements for styli and light-pens 40
Table 20 — Design requirements for touch-sensitive screens 42
Table A.1 — Structure of ISO 9241 — Ergonomics of human–system interaction 43
Table B.1 — Task and condition variations 45
Table C.1 — Independent rating scale 52
Table C.2 — Dependent rating scale 53
Table C.3 — Borg scale 54
Table C.4 — Borg scale for arm, shoulder, and neck effort 54
Table D.1 — Reflectance of surfaces 58
Table D.2 — Independent rating scale 60
Table D.3 — Example of material for data entry (English language) 61

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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/TS 9241-411 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

This first edition of ISO/TS 9241-411, together with ISO 9241-400, ISO 9241-410 and ISO 9241-420, cancels and replaces ISO 9241-4 and ISO 9241-9, technically revised as follows:

— terms and definitions from ISO 9241-4 and ISO 9241-9 have been transferred to ISO 9241-400;

— guiding principles, collected in ISO 9241-400, have been incorporated and unified so that they correspond to the scope of the new ISO 9241 series;

— test methods taken from ISO 9241-4 and ISO 9241-9 have been reviewed and amended and new test methods introduced and collected in annexes for greater convenience.

ISO/TS 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*

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— *Part 5: Workstation layout and postural requirements*

— *Part 6: Guidance on the work environment*

— *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 100: Introduction to standards related to software ergonomics* [Technical Report]

— *Part 110: Dialogue principles*

— *Part 129: Guidance on software individualization*

— *Part 143: Forms*

— *Part 151: Guidance on World Wide Web user interfaces*

— *Part 154: Interactive voice response (IVR) applications*

— *Part 171: Guidance on software accessibility*

— *Part 210: Human-centred design for interactive systems*

— *Part 300: Introduction to electronic visual display requirements*

— *Part 302: Terminology for electronic visual displays*

— *Part 303: Requirements for electronic visual displays*

— *Part 304: User performance test methods for electronic visual displays*

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

— *Part 309: Organic light-emitting diode (OLED) displays* [Technical Report]

— *Part 310: Visibility, aesthetics and ergonomics of pixel defects* [Technical Report]

— *Part 331: Optical characteristics of autostereoscopic displays* [Technical Report]

— *Part 400: Principles and requirements for physical input devices*

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

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— *Part 411: Evaluation methods for the design of physical input devices* [Technical Specification]

— *Part 420: Selection of physical input devices*

— *Part 910: Framework for tactile and haptic interaction*

— *Part 920: Guidance on tactile and haptic interactions*

The following parts are under preparation:

— *Part 391: Requirements, analysis and compliance test methods for the reduction of photosensitive seizures*

User-interface elements, ergonomic requirements for the reduction of visual fatigue from stereoscopic images, and the evaluation of tactile and haptic interactions are to form the subjects of future parts 161, 392 and 940.

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Introduction

Input devices are a means for users to enter data into interactive systems. Generally speaking, an input device is a sensor that can detect changes in user behaviour (gestures, moving fingers, etc.) and transform them into signals to be interpreted by the interactive system.

This part of ISO 9241 presents methods for the laboratory analysis and comparison of input devices for interactive systems. It does not contain requirements for input devices, but provides the means for evaluating conformance with the requirements of ISO 9241-410 for input devices such as keyboards, mice, pucks, joysticks, trackballs, touch pads, tablets/overlays, touch-sensitive screens, and styli/light pens.

The target users of this part of ISO 9241 are manufacturers, product designers and test organizations concerned with commercial input devices such as the physical input devices listed above.

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