

# INTERNATIONAL STANDARD

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## **Ergonomics of human-system interaction —**

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

*Ergonomie de l'interaction homme-système —*

*Partie 151: Lignes directrices relatives aux interfaces utilisateurs Web*



Reference number  
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## ISO 9241-151:2008(E)

### 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 9241-151 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system 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*

Guidance on software individualization is to form the subject of a future part 129.

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 electronic visual display requirements*
- *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 308: Surface-conduction electron-emitter displays (SED) [Technical Report]*
- *Part 309: Organic light-emitting diode (OLED) displays [Technical Report]*
- *Part 400: Principles and requirements for physical input devices*
- *Part 410: Design criteria for physical input devices*
- *Part 920: Guidance on tactile and haptic interactions*

Framework for tactile and haptic interaction is to form the subject of a future part 910.

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### Introduction

It is widely accepted that usability is a key factor in successful website design but until now there has been no internationally agreed standard that specifically addressed the usability of World Wide Web (WWW or Web) user interfaces.

World Wide Web user interfaces pose particular usability problems:

- their users are diverse in knowledge, capabilities, language and other factors — for example, a World Wide Web user interface that works well for subject-matter experts may be sub-optimal for ordinary users;
- users' goals vary considerably — for example, a site optimized for one set of tasks (such as e-commerce transactions) could be sub-optimal for users whose tasks are different (such as information gathering);
- different Web browsers or user agents often render Web content in different ways — for example, the layout of individual pages can change, sometimes quite dramatically.

Users of the World Wide Web will have experienced the problems of inconsistency between websites and often even within the same website. For example, something as straightforward as a link may be denoted by underlining on one page, by a mouse-over on a second page and by nothing at all on a third page.

A number of guidelines for good practice exist, many on the Web itself, but these guidelines sometimes conflict and can also be difficult to put into practice. While not addressing Web user interfaces specifically, a number of International Standards are available that provide useful guidance on usability and the design of user interfaces: ISO 9241-11 to ISO 9241-17 and ISO 9241-110 provide ergonomic guidance on the design of software user interfaces in general, ISO 13407 on achieving usability by incorporating user-centred design activities throughout the life cycle of interactive computer-based systems, and the ISO 14915 series of standards on the design of multimedia and hypermedia aspects of user interfaces.

The recommendations and guidelines provided in this part of ISO 9241 apply primarily to the design of the content of a website or, more generally, a Web application, the user's navigation and interaction, as well as the presentation of the content. The user interface of different types of user agents (such as Web browsers) or additional tools such as Web authoring tools are not the subject of this part of ISO 9241, although some guidelines could apply to those systems as well. Aspects of the technical implementation of the recommendations are also not within its scope.

An important objective for developing Web user interfaces is to make them accessible to the widest possible range of users, including persons with disabilities. While some guidance provided in this part of ISO 9241 is also important for the accessibility of Web user interfaces, it does not aim at covering accessibility in a comprehensive manner. Common guidance on securing and improving accessibility to ICT (information and communication technology) equipment, software and services can be found in ISO 9241-20, and detailed guidance on the accessibility of software user interfaces in general can be found in ISO 9241-171, while the World Wide Web Consortium's *Web Accessibility Initiative* provides guidance specifically for Web content, user agents and authoring tools.

ISO 9241 was originally developed as a seventeen-part International Standard on the ergonomics requirements for office work with visual display terminals. As part of the standards review process, a major restructuring of ISO 9241 was agreed to broaden its scope, to incorporate other relevant standards and to make it more usable. The general title of the revised ISO 9241, "Ergonomics of human-system interaction", reflects these changes and aligns the standard with the overall title and scope of Technical Committee ISO/TC 159, SC 4. The revised multipart standard is structured as series of standards numbered in the "hundreds": the 100 series deals with software interfaces, the 200 series with human centred design, the 300 series with visual displays, the 400 series with physical input devices, and so on.

See Annex A for an overview of the entire ISO 9241 series.

# Ergonomics of human-system interaction —

## Part 151:

## Guidance on World Wide Web user interfaces

### 1 Scope

This part of ISO 9241 provides guidance on the human-centred design of software Web user interfaces with the aim of increasing usability. Web user interfaces address either all Internet users or closed user groups such as the members of an organization, customers and/or suppliers of a company or other specific communities of users.

The recommendations given in this part of ISO 9241 focus on the following aspects of the design of Web user interfaces:

- high-level design decisions and design strategy;
- content design;
- navigation and search;
- content presentation.

The user interfaces of different types of user agents such as Web browsers or additional tools such as Web authoring tools are not directly addressed in this part of ISO 9241 (although some of its guidance could apply to these systems as well).

Web user interfaces are presented on a personal computer system, mobile system or some other type of network-connected device. While the recommendations given in this part of ISO 9241 apply to a wide range of available front-end technologies, the design of mobile Web interfaces or smart devices could require additional guidance not within its scope; neither does it provide detailed guidance on technical implementation nor on issues of aesthetic or artistic design.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 9241-11, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 11: Guidance on usability*

ISO 9241-12:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 12: Presentation of information*

ISO 9241-13, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 13: User guidance*

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ISO 9241-14, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 14: Menu dialogues*

ISO 9241-15, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 15: Command dialogues*

ISO 9241-16, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 16: Direct manipulation dialogues*

ISO 9241-17, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 17: Form filling dialogues*

ISO 9241-20, *Ergonomics of human-system interaction — Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services*

ISO 9241-110, *Ergonomics of human-system interaction — Part 110: Dialogue principles*

ISO 9241-171, *Ergonomics of human-system interaction — Part 171: Guidance on software accessibility*

ISO 9241-303, *Ergonomics of human-system interaction — Part 303: Requirements for electronic visual displays*

ISO 13407, *Human-centred design processes for interactive systems*

ISO 14915 (all parts), *Software ergonomics for multimedia user interfaces*

WCAG 1.0, *Web Content Accessibility Guidelines 1.0*, W3C Recommendation, World Wide Web Consortium (W3C) (MIT, INRIA, Keio)

WCAG 2.0, *Web Content Accessibility Guidelines 2.0*, World Wide Web Consortium (W3C) (MIT, ERCIM, Keio) <sup>1)</sup>

### 3 Terms and definitions

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

#### 3.1

##### **boolean search**

search formulation using logical operators

#### 3.2

##### **browser**

user agent allowing a person to retrieve and read hypertext, to view the contents of hypertext nodes (usually Web pages), to navigate from one node to another, and to interact with the content

NOTE A browser also offers a set of operations, e.g. for navigating websites or for changing the visual appearance of the content displayed.

#### 3.3

##### **conceptual content model**

abstract model describing the concepts of an application domain, the relationships among those concepts and the operations to be performed on the concepts or relationships

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1) Working draft. Intended to supersede WCAG 1.0 in its final published version.

### 3.4

#### **content**

##### **web content**

(Web user interface) set of content objects

### 3.5

#### **content object**

interactive or non-interactive object containing information represented by text, image, video, sound or other types of media

### 3.6

#### **dynamic navigation link**

##### **computed link**

link that is computed dynamically by the system based, for example, on the content of a database

### 3.7

#### **frame**

mechanism for dividing a browser window into independent windows, each displaying a different document, or different parts of the same document

### 3.8

#### **frameset**

collection of frames and a corresponding layout structure that is presented in the same browser window

### 3.9

#### **global navigation**

set of navigation links available on all pages of a website

### 3.10

#### **home page**

start page

top page

main page through which users typically enter a website and whose URL is typically published or linked as the main Web address of an organization or an individual

NOTE The term *home page* can be used differently in different contexts. Some groups will call a complete website a home page.

### 3.11

#### **interaction object**

component of the Web user interface accepting user input

EXAMPLE Links, buttons, input fields, check boxes or selection lists.

### 3.12

#### **Internet**

worldwide interlinked computer systems and computer networks connected via gateways that enable the transfer of data between them

### 3.13

#### **intranet**

computer network using Internet standards, the access to which is limited to members of a particular organization such as a company

### 3.14

#### **landmark page**

##### **landmark**

main page in the navigation structure that can be directly accessed from many other pages

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### 3.15

#### **link** **hyperlink**

⟨World Wide Web⟩ reference from some part of one document to (some part of) another document or another part of the same document

NOTE Links are also called hyperlinks because hypertext and hypermedia systems make extensive use of this concept. Links are used for activating navigation. They are represented, for instance, as element tags in the hypertext markup language (HTML). The concept of links is also described in ISO 14915-2 in the context of multimedia user interfaces.

### 3.16

#### **link cue**

textual or graphical presentation of a link showing information about the link target

### 3.17

#### **media object**

component of a Web document that is implemented by a single media type

EXAMPLE 1 A text object presenting a discussion about some topic.

EXAMPLE 2 An image object presenting a picture of some person.

EXAMPLE 3 A sound object presenting a song.

NOTE Adapted from ISO 14915-2:2003, definition 3.3.

### 3.18

#### **navigation component**

group of navigation elements placed together

### 3.19

#### **profile** **user profile**

set of attributes used by the system that are unique to a specific user/user group

### 3.20

#### **predefined user profile**

profile based on a stereotype or combination of stereotypes

NOTE 1 Stereotypes used as the basis of a predefined user profile could include a role, a job function or a group membership.

NOTE 2 Predefined user profiles are often used to define access privileges to specific Web content.

### 3.21

#### **rendering**

act whereby the information in a document is presented

NOTE This presentation is done in the form most appropriate to the environment (e.g. aurally, visually, in print).

### 3.22

#### **navigation** **Web navigation**

⟨World Wide Web⟩ movement between or within Web pages or the movement within some presentation segment presented on a page (e.g. the movement within a particular media object) that users perform to find a specific function or piece of information

NOTE 1 In this part of ISO 9241, *navigation* is used as a convenient short form for *Web navigation* (see also ISO 14915-2).

NOTE 2 Navigation steps are often initiated by activating some link.

### 3.23

#### **navigation structure**

##### **Web navigation structure**

⟨World Wide Web⟩ structure composed of elementary or composite presentation segments (such as Web pages or media objects contained in a page) and links, determining all possible paths on which users can move around in a Web user interface

### 3.24

#### **screen reader**

assistive technology that allows users to operate software without needing to view the visual display

NOTE 1 Output of screen readers is typically text-to-speech or Braille.

NOTE 2 Screen readers rely on the availability of information from the operating system and applications.

### 3.25

#### **site map**

textual or graphical overview of the complete navigation structure of a website

### 3.26

#### **splash screen**

temporary page shown prior to the homepage when a website is first accessed

### 3.27

#### **tool tip**

small pop-up window that appears when the mouse pointer is moved over an interaction object and that shows explanatory text or help information

### 3.28

#### **transaction**

action that involves inserting, updating or deleting information

### 3.29

#### **Web user agent**

##### **user agent**

front-end software that enables users to interact with a remote system through Internet protocols

NOTE A *browser* is a specific type of user agent.

### 3.30

#### **uniform resource locator**

##### **URL**

mechanism for identifying resources on the Internet (such as Web pages) by specifying the address of the resource and the access protocol used

NOTE The official technical term as specified by the IETF is *uniform resource identifier* (URI), of which *URL* is a subset.

### 3.31

#### **Web page**

coherent presentation of a content object or set of content objects and associated interaction objects through a user agent

### 3.32

#### **Web service**

Web resource providing content and/or functionality that can be accessed remotely through standardized protocols and software interfaces