

DIN 66234, Part 8 is the result of questioning ca. 300 members of the *Gesellschaft für Informatik* (computer science society) and of the German Chapter of the ACM. This document refers mainly to the layouting of the screen page and organization of user-machine dialogues. It builds on the basis of five general principles:

- *Relation to the function* (Aufgabengemessenheit)
- *Visibility* (Selbstbeschreibungsfähigkeit)
- *Controllability* (Steuerbarkeit)
- *Consistency* (Erwartungskonformität)
- *Insensitivity to errors* (Fehlerrobustheit)

- US MIL-STD 1472D "Human Engineering Design Criteria for Military Systems, Equipment and Facilities", U.S. Govt. Printing Office, Mar.14, 1989.

U.S. military standard, almost three hundred pages long, largely on traditional ergonomic or anthropometric issues; the latest editions pay attention to the user-computer interface.

- ANSI/HFS 100-1988 "American National Standard for Human Factors Engineering of Visual Display Terminal Workstations", 90 pp., February 1988.

HFS is the Human Factors Society. This standard specifies conditions for acceptable implementation of human factors engineering principles and practices in the design of visual display terminals (VDTs); it covers also the related furniture in the office environment. The standard deals with VDT applications as text processing, data entry, and data inquiry.

- ANSI/IEEE 845-1988 "Guide to Evaluation of Man-Machine Performance in Nuclear Power Generating Stations, Control Rooms and Other Peripheries"
- ANSI/IEEE 1023-1988 "Guide for the Application of Human Factors Engineering to Systems, Equipment and Facilities of Nuclear Power Generating Stations"
- ASTM F1166-88 "Standard Practice for Human Engineering Design for Marine Systems, Equipment and Facilities", Vol 01.07, 155 pages (1988).

This standard builds on several other standards (mostly U.S.-military) and recommendations applicable in shipbuilding. A total of about 20 pages is dedicated to Man-Machine interface aspects of interest also in industrial applications; these recommendations are commonplace and similar to other norms.

- Part 12 "Presentation of information / coding and formatting"
- Part 13 "User guidance / terminology"
- Part 14 "Menu dialogues"
- Part 15 "Command language dialogues"
- Part 16 "Direct manipulation dialogues"
- Part 17 "Form-filling dialogues"

- DIN 33414 "Ergonomische Gestaltung von Warten" (*ergonomic design of control rooms*)

Teil 4 "Gliederungsschema, Anordnungsprinzipien" (*arrangement and layout principles*), Oct.90, 11 pp.

Indications on how instruments and indicators should be located and organized on a control panel.

- DIN 66234 "Bildschirmarbeitsplätze" (*display work places*)

- Teil 1 "Geometrische Gestaltung der Schriftzeichen" (*character shapes*), Mar.80, 3 pp.
- Teil 2 "Wahrnehmbarkeit von Zeichen auf Bildschirmen" (*perceptibility of characters*), May.83, 4 pp.
- Teil 3 "Gruppierung und Formatierung von Daten" (*grouping and formatting of data*), Mar.81, 2 pp.
- Teil 5 "Codierung von Information" (*coding of information*), Mar.81, 6 pp.
- Teil 5, Beiblatt 1 "Verwendung von Grafik" (*use of graphics*), Sep.88, 2 pp.
- Teil 5, Beiblatt 2 "Farbkombinationen" (*use of colours*), May 88, 2 pp.
- Teil 6 "Gestaltung des Arbeitsplatzes" (*design of the work station*), Dec.84, 4 pp.
- Teil 6, Beiblatt 1 "Beispiele" (*illustrations*), Dec.84, 3 pp.
- Teil 7 "Ergonomische Gestaltung des Arbeitsraumes; Beleuchtung und Anordnung" (*ergonomical design of the work station, lighting and arrangement*), Dec.84, 5 pp.
- Teil 8 "Grundsätze ergonomischer Dialoggestaltung" (*principles of ergonomic dialogue design*), Feb.88, 6 pp.
- Teil 9 "Meßverfahren" (*measuring technique*), Aug.88, 7 pp.
- Teil 10 "Mindestangaben für Bildschirmgeräte" (*minimum information to be specified for visual display units*), Entwurf May 88, 10 pp.

- NASA: "Space Station Freedom Program: Human-Computer Interface Guide", Version 2.1, Johnson Space Center, Houston, TX, December 1988.

Specific guidelines for designers of space station user interfaces.

- "Guidelines for Control Room Reviews", NUREG-0700, U.S. Nuclear Regulatory Commission, Washington, DC, September 1981.

Detailed checklist and issues for evaluating nuclear reactor control rooms, with many items of interest to other control room or workstation designers.

Standards

- ISO 9241 "Ergonomic requirements for office work with visual display terminals (VDTs)"

International standard, still in draft version (1993). This standard is concerned with the users operating the VDTs and with the desired user performance rather than VDT design [ISO committee ISO/ TC 159 / SC4].

This draft standard encompasses office tasks like text and data processing but not computer aided design tasks (CAD) or industrial process control tasks; it emphasizes the interaction user/system and performance evaluation methods. It is structured in several documents, the majority of which is scheduled for publication in 1994.

The documents that are part of ISO 9241 are the following:

- Part 1 "General introduction"
- Part 2 "Office VDT task requirements"
- Part 3 "Visual display requirements"
- Part 4 "Keyboard requirements"
- Part 5 "VDT workplace design"
- Part 6 "VDT working environment"
- Part 7 "VDT surfaces and filters"
- Part 8 "Use of color and graphics"
- Part 9 "Non-keyboard input devices"
- Part 10 "Dialogue principles"
- Part 11 "Methods for evaluating and testing software usability"

A1 Guidelines and Standards for the User Interface

Guidelines

- "Apple Human Interface Guidelines: The Apple Desktop Interface", Apple Computer and Addison Wesley Publishing Co. (1987).

The first guide for program developers to the Apple desktop interface, the graphics-based "mouse, windows and menus" interface made popular on the Macintosh computer. It describes the basic design principles, indicates how the elements of the interface should work; it contains also several practical examples.

- "IBM Systems Application Architecture (SAA) - Common User Access (CUA), Guide to User Interface Design", IBM Document SC34-4289-00 (1991)
- "IBM Systems Application Architecture (SAA) - Common User Access (CUA), Advanced Interface Design Reference", IBM Document SC34-4290-00 (1991)

These documents describe the configuration and programming rules for the windows-based user interface in IBM computer environments; CUA is the foundation for the OS/2 Presentation Manager. Also the "desktop manager" of the MS-Windows Graphical User Interface (GUI) follows the SAA set of guidelines. In the earlier version of the IBM-SAA documents there were explicit references to the Apple interface guidelines; such references have been purged from the current editions of the IBM guides.

- Open Software Foundation: "OSF/Motif Style Guide" and "OSF/Motif User's Guide", Prentice Hall, Englewood Cliffs, NJ, 1990.

Readable explanations for designers and for users to create or use applications under the OSF/Motif environment. Covers menus, windows, dialog boxes, and help functions.

- Sun Microsystems Inc.: "OPEN LOOK Graphical User Interface: Functional Specifications" (564 pages) and "OPEN LOOK Graphical User Interface: Application Style Guidelines" (388 pages), Addison-Wesley, Reading, MA, December 1989.