

# Information Technology Standards in ISO/IEC JTC1

Over the past few columns I have been going over each of the major standards committees which are developing standards for user interfaces and user centered design, each column covering one committee or a set of related committees. In the last issue I paused to give a general update on current notable activities in several committees, but in this column I return to focus on user interface standards in ISO/IEC JTC1, the Joint Technical Committee on Information Technology standards.

ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission) are two major international

bodies for engineering and industrial standardization. Both are voluntary, consensus based standards consortia. While ISO covers a broad range of industrial and commercial standards, IEC focuses more directly on electrical and electronics engineering standards. ISO and IEC established a joint technical committee in the field of information technology, a field in which both organizations have an interest (and still pursue separately as well as in the activities of the joint committee). This committee is ISO/IEC JTC1 (there are currently no other joint technical committees beyond "1"). JTC1 is a substantial standards body in itself, composed of a variety of subcommittees ("SCs") which cover individual content areas of information and computer technology.

Of most relevance to professionals in human-computer interaction design is Subcommittee 18 (ISO/IEC JTC1 SC18), "Document Processing and Related Communication". The bulk of

the work in this subcommittee is in the area of electronic document creation, manipulation, presentation, transfer and storage. Perhaps the SC18 accomplishment most familiar to user interface designers is SGML, Standard Generalized Markup Language, which is a set of standard document formatting commands to be embedded in text, giving instructions for typesetting or graphical presentation of text on screens or paper (ISO/IEC 8879). SGML itself is perhaps better known to UI designers as the progenitor of HTML, the Hypertext Markup Language, which is a standard markup language for presentation of text and graphics on the World Wide Web.

Under the rubric of text and document work, however, is work on user interface design. SC18 is divided into Working Groups (JTC1 organization structure parallels that of ISO). Working Group 9 (ISO/IEC JTC1 SC18 WG9) is "User System Interface and Symbols". This committee has steadily worked on user interface standards across a much broader domain than is typical among other the standards committees dis-

cussed in my previous columns. WG9 projects range from hardware (keyboards, office equipment) to software (screen display), and include computer systems (cursors, gestures, icons), but also telecommunications (voice mail). Table 1 summarizes completed and ongoing WG9 projects.

## Keyboards and Keypads

ISO/IEC JTC1 SC18 WG9 has extended much effort in keyboards standards: an 8-part international standard on the layout of computer (and other) keyboards (Table 2) and three other supplemental keyboards documents currently being written and edited.

ISO/IEC 9995 began as an attempt to standardize the location of specific keys on "information technology equipment" (meaning principally – but not exclusively – computers and computer terminals). Agreement on standardizing the locations of specific alphanumeric keys was impractical given the enormous variety of national standards and variations in characters required for different languages. Instead, this com-

**Table 1.** Current Status of ISO/IEC JTC1 SC18 WG9 Standards

<i>Completed standards (published international standards available for purchase)</i>	
ISO/IEC 9995	Keyboard layouts for text and office systems
ISO/IEC 13714	User interface to telephone-based services: Voice messaging applications
<i>Standards in development: Committee Drafts</i>	
ISO/IEC 10741	Cursor Control
ISO/IEC 11581	User system interfaces and symbols – Icon symbols and functions
ISO/IEC 13251	Graphical symbols for office equipment
ISO/IEC 14754	Common gestures for text editing with pen-based systems
ISO/IEC 14755	Input methods to enter characters from the repertoire of ISO/IEC 10646 with the help of keyboards or other input/output devices
ISO/IEC 15412	Keyboard layouts for transportable computers
ISO/IEC 15439	Segmented keyboard layout requirements
<i>Technical Report (in development)</i>	
ISO/IEC TR 15440	Technical report on future keyboards and other associated input devices and related entry methods

pleted international standard defines four sections and 20 component zones which are assigned to contain keys of various specified functions. More specific assignment of individual characters or keys to exact locations on the keyboard grid is left to national standards agencies (for example, in the U.S. ANSI has an existing standard for the layout of keys on the QWERTY keyboard).

**Table 2. ISO/IEC 9995: Information Technology - Keyboard Layouts for Text and Office Systems**

Part 1	General principles governing keyboard layouts
Part 2	Alphanumeric section
Part 3	Complementary layouts of the alphanumeric zone of the alphanumeric section
Part 4	Numeric section
Part 5	Editing section
Part 6	Function section
Part 7	Symbols used to represent function
Part 8	Allocation of letters to the keys of a numeric keypad

Some reference is made to the relative locations of some of the zones with respect to some reference keys such as the space bar, the escape key, and the digit one in the alphanumeric and numeric sections. The standard also lists some of the keys which should go into each section or zone. The four major sections of a standard keyboard are the

- Alphanumeric section: center left section containing Latin alphabet letters, numbers, and symbols
- Editing section: section between alphanumeric and numeric sections contain arrow keys and the like
- Function section: section to the top and extreme left of the other zones with function and special keys
- Numeric section: right extreme section contain numbers in a 'square' calculator or telephone layout

The one exception to exact specification of key-character layout is the numeric section of the keyboard, which is the 3 x 4 keypad grid of numbers and the

symbols \* and #. The keypad may be in a calculator ("7-8-9") or North American telephone ("1-2-3") layout. Assignment of the letters A-Z for each of the 9 numeric keys is specified.

After completion of this standard, there was still a need for further specifications, and these have spawned several new standards which supplement 9995. (Because the existing parts of 9995 are completed, these supplements have been given new JTC1 numbers.) ISO/IEC 15412 will cover the keyboard layouts for the compressed style keyboards found on portable computers (the title will shortly be changed to "Keyboards for portable computers"). ISO/IEC 15439 will cover split keyboards, meaning the so-called "ergonomic" keyboards which split and bend into halves so that users' wrists may oriented straight with respect to the keys (e.g. the Microsoft Natural Keyboard). ISO/IEC 15440 will be a Technical Report, meaning that it contains no normative standards, which will cover other keyboard and input device topics which are not currently covered in the three existing and planned keyboard documents, and which may not be ready for strict standardization, e.g. single-hand keyboards, linear keyboards, virtual keyboards, keyboards for disable users, and keyboards for specific application areas).

### Voice Messaging

This completed standard intends to provide users of telephone-based voice mail systems with a consistent way of interacting with such systems. The standard covers user procedures for leaving messages in a call answering system (call answering may be a component of voice mail or a component of other types of automated telephone systems). It also covers procedures and some touch-tone key assignments for sending, retrieving, and manipulating messages in a voice mail system with a touch-tone telephone control interface. The standard covers voice messaging, meaning voice mail and call answering, and does not explicitly cover the entire universe of touch-tone telephone-based services (called IVR, interactive voice response, services).

The history of this standard began with efforts to standardize some aspects of

voice mail user interfaces in the United States. Bellcore and the local service telephone companies began a Voice Messaging Group which produced a user interface specification in 1989. Members of this group joined with others in this industry to form larger, independent group (with wider representation) called the Voice Messaging User Interface Forum (VMUIF) which produced another voice mail standard in 1990. VMUIF brought this activity to ANSI X3V1 in 1990, which began work on a voice messaging standards in its Text and Office Systems group (TG9). (Thus, even wider representation in the voice mail and information technology industries was brought to bear on this standards effort.) In 1991, WG9 in JTC1 brought up a new work proposed to do voice mail work as well, at which point ANSI joined this work so that ANSI would have a single common standard with the international group. ANSI contributed their ongoing work to WG9 which was then progressed quickly in JTC1 so that ISO/IEC 13714 (and ANSI/ISO 13714) became an international standard in May 1996.

The voice mail standard gives specific recommendations on aspects of the telephone user interface, such as minimum response time, figures for inter-key time-outs, error handling and response to repeated time-outs. It specifies dial-ahead and dial-through behavior. Also specified is the details of the behavior of the # and \* keys of the touch-tone keypad. Standardized assignments of touch-tone keys to functions are specified for (a) the control menu, a series of functions which should be available from any system state (e.g. \*0 for help), (b) call answering before and after the record tone, (c) the main menu of voice mail applications, (d) the menu for listening to and administering messages, and (e) sending a message, before and after the record tone. A series of key assignments and requirements are also specified for bulletin board systems.

### Icons and Symbols

ISO/IEC JTC1 SC18 WG9 has worked on several projects involving graphic symbols on equipment, screens, and computer screens. One major document nearing completion is ISO/IEC



11581 which applies to icons which are shown on computer screens, that is, GUI icons which represent data and applications and which users manipulate to perform actions. The standard is divided into several sections which cover icons of individual functions. These sections are listed in Table 3 along with their current status (CD, or Committee Draft, is a middle stage in JTC1 and ISO standards development and DIS, Draft International Standard, is the penultimate stage).

**Table 3.** ISO/IEC 11581: Information Technology – User System Interfaces and Symbols – Icon Symbols and Functions

Section/name	Status <sup>a</sup>
Part 1 Icons – General	DIS
Part 2 Object icons	DIS
Part 3 Pointer icons	DIS
Part 4 Controls	CD
Part 5 Tools	CD
Part 6 Action icons	CD

a. As of early 1997

The ISO/IEC 11581 set of standards, in its early stages, attempted to standardize the specific appearance of icons. However, as that became unworkable, due partly to the wide variety of graphic environments, the standard instead defines picture content by the essential elements of a picture which are to be recognized by users. Pictures are still given in this standard, but the pictures

shown in the standard are to be treated as typical instantiations of the icons. The graphics provided in the documents are basic, simple, black and white, line drawings. For example, a help icon is defined as "a question mark as commonly used in Latin languages". A search icon is defined as "a hand held torch or flashlight" which is composed of two rectangles oriented diagonally with lines representing light beams coming out of the flashlight toward the lower right corner of the picture. A large variety of icons are specified for system and document manipulation functions.

Another standard, also in committee draft form, provides specification for graphical symbols on hardware, specifically office equipment (computers, printers, telephones, etc.). A particular concern currently with this standard is its potential overlap with existing ISO standards.

### Other WG9 Activities

In addition to the above, three other WG9 standards are in committee draft. ISO/IEC 10741-2 provides standards for control of cursors in spreadsheet applications. Also nearing completion this year is a standard on procedures for entering symbols (based upon the UCS specification) which do not appear on a keyboard, e.g. entering a non-Latin alphabet character from a Latin alphabet keyboard. ISO/IEC UCS (Universal multiple-octet-coded character set, ISO/IEC 10646) is a standard devel-

oped elsewhere in JTC1, related to the Unicode standard, which specifies codes for all the characters of every world language and graphical symbols. The WG9 standard attempts to specify an end-user procedure by which any of these symbols could be entered even though it does not appear on a keyboard. A third draft document, ISO/IEC CD 14754.3, attempts to define a common standard set of gestures used in pen-based systems (i.e., certain movements of the pen will mean actions such as moving an object, scrolling, deleting, etc.). Another document from WG9 titled "Objects and Actions", which was circulated in early draft form to some standards committees, has been formally withdrawn.

Finally, it should be noted that JTC1 is currently studying a massive reorganization of its committee structure (an Ad Hoc committee on JTC1 "reengineering" is expected to report final recommendations after June). This could well have implications for user interface standards, e.g. user interfaces could be organized under its own more specific subcommittee. Look to this column for updates on WG9 activities.

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