Standardization

Ever-cheaper solid-state electronic circuitry is a genuine cause for rejoicing. It will contribute to superior solutions to many of the tough old problems of rehabilitative engineering. It will even convert some "impossibilities" into only moderately difficult R&D propositions. But these good things won't happen as quickly, cheaply, or effectively as they should unless the frustrating "incompatibility" barriers can be lowered. This new BPR department will seek to define problems and monitor promising activity in that newly vital area of the field.

Conference Title

INTERNATIONAL STANDARD CONNECTIONS PROJECT
(Report from the Second Meeting)

Chairman: Gregg C. Vanderheiden, Trace Research and Development Center for the Severely Communicatively Handicapped, University of Wisconsin, Madison, Wisconsin.

June 19, 1980 (during International Conference on Rehabilitation Engineering, Toronto, Ontario, Canada).

The Common Interconnection Format project is a project funded by the National Science Foundation and headquartered at the Trace Center at the University of Wisconsin. It is being carried out by a consortium of individuals from the United States, Canada, and Europe. The purpose of the project is to develop common interconnection formats for assistive devices for the physically handicapped. The project represents the formalization of an informal process which had been underway for several years on a non-funded basis. The National Science Foundation has provided funding to provide a base for the project (and some support to the various participants) in order to facilitate the overall process.

The two major components of the Common Interconnection problem are: 1. trying to make the interconnections compatible electrically and mechanically and with regard to format, so that different interfaces which are functionally equivalent can be used interchangeably; and 2. developing a naming format which will allow clinicians, parents, and handicapped individuals to determine which interfaces are functionally equivalent, as well as which ones are compatible. There are, for example, interfaces (such as joysticks) which look the same but which are functionally quite different (e.g., Microswitch versus proportional joysticks). On the other hand, there are interfaces which are functionally equivalent even though they may look quite different (e.g., a four-position joystick and a four-slot arm control). There are, unfortunately, also switches which are functionally equivalent but which are wired in non-compatible fashions (e.g., one wire common versus X-Y wiring). Although an engineer can usually determine the specific function and electrical characteristics of an interface by opening it up, engineers are not aways available, and when they are, they often have to buy (and perhaps destroy) the interfaces in order to determine whether they are going to work for a given aid or situation.

Since many of the aids are electrically compatible but simply use different connectors, adaptors are often very valuable. However, their use and availability without simple and effective standard naming formats can further complicate the issue. The ideal format would allow a parent, clinician, or handicapped individual with no knowledge of electricity whatsoever to successfully identify a wide variety of interfaces which would work with any given aid, and to separate these from those interfaces which would not work. It would also allow the individual to know whether an adaptor was needed, and if so, what that adaptor would be. Preliminary tests have shown that this is feasible and can be fairly straightforward.

People interested in the project have met twice, once at the 1979 Interagency Conference on Rehabilitation Engineering, and again at the 1980 International Conference on Rehabilitation Engineering. Reports on both meetings are available: write to the project's base at the Trace Center.

The following is a synopsis of the results of the 1980 Standards meeting.

The primary goal of this meeting was threefold: first, to update the participants on the ideas from the various contributors and the progress on the project to date; second, to develop a framework for looking at the problem and for categorizing the different aspects of it; and third, to map out priorities for the first year's work on the project.

The first result of the meeting was the delineation of the problem into **five types of interconnections** (Fig. 1) These include:

1. The interconnection which exists between user interfaces and the basic control system. The user interface is usually in the form of a simple switch, although it sometimes becomes quite complex, as in the situations where a "smart" switch may be involved.
2. The interconnection between one controller and another; e.g., where one aid inputs to a totally separate aid.
3. The interconnection between the controller and an output device or accessory, such as a printer.
4. The interconnection between the controller and the user, giving auditory or visual feedback or indication.
5. The interconnection between the battery charger or external battery packs and the aid.

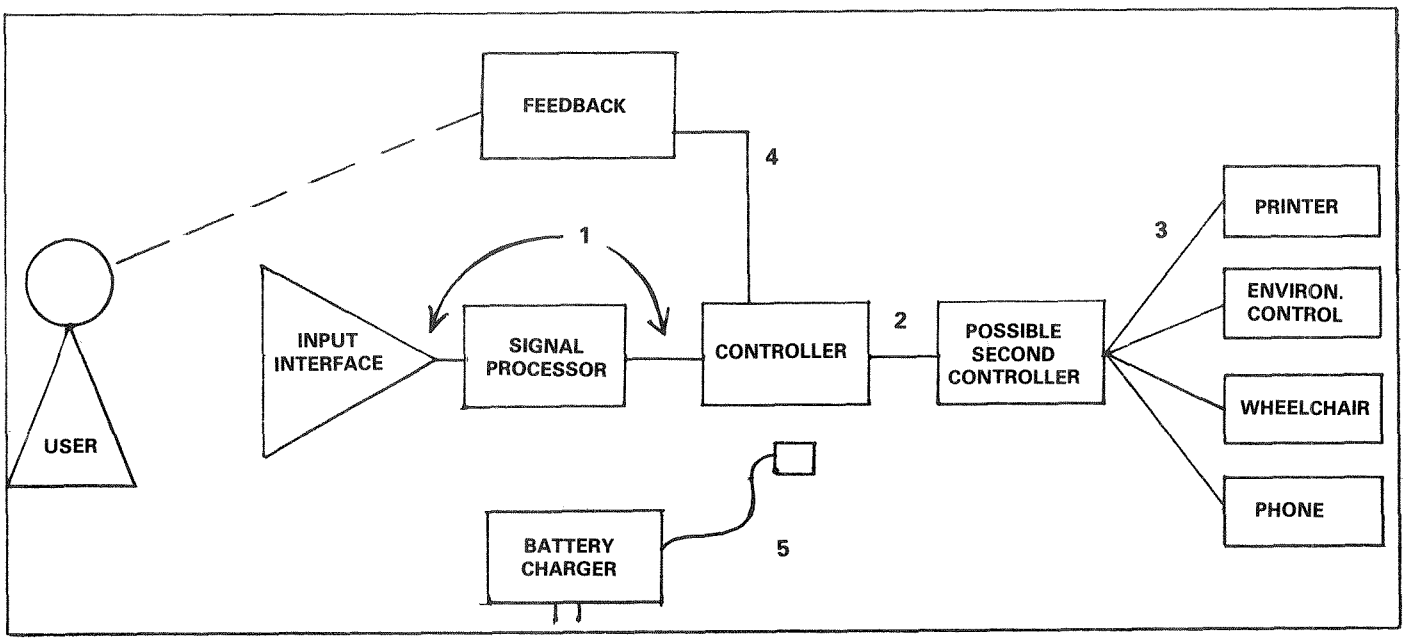

FIGURE 1.
Block diagram of hypothetical aid locates the five types of interconnections delineated.

The participants then decided that the focus for the first year would be an attack on the most difficult and most pressing area, that of the Type 1 interconnection. The interconnection compatibility problem was then examined in more detail, and was broken down into aspects and levels of compatibility.

Thirteen levels of compatibility were defined which need to be considered in solving the Type 1 interconnection problem. They are:

1. Know if they **will** work together;
2. Non-destruct?
3. Know if they **could** work together;
4. Language compatibility?
5. Electrical compatibility (independently powered)?
6. Electrical compatibility (parasitically powered)?
7. Signal convention compatibility?
8. Handshaking compatibility?
9. Adaptor compatibility (intelligent)?
10. Adaptor compatibility (electronic, non-intelligent)?
11. Adaptor compatibility (hardware only)?
12. Pinout convention?
13. Connector set standardized?

There are 12 aspects of compatibility which were considered. They are:

1. Mechanical;
2. Frequency;
3. Voltages;
4. Currents (loads);
5. Flow direction;
6. Signal formats;
7. "Handshaking" languages and codes (ASCII);
8. Pinouts;
9. Connectors;
10. Switch matrix configuration conventions;
11. Optical, inductive, sonic, RF; interference and range; and
12. Existing standards.

The participants then set rather ambitious 6-month and 12-month goals. The 6-month goals were: having a first draft of the naming format, and nominations for a pinout convention by 6 months. The participants set the twelve-month goals as:

1. A revised, tested, naming format;
2. First electrical parameters convention for Type 1 interconnections;
3. First pinout convention for Type 1 interconnections;
4. Configuration conventions for Type 1 interconnections;
5. A matrix configuration convention.

In addition, it was decided that the project would leave the Type 2 and Type 3 interconnection problem open, and begin to collect information and input to those problems for later detailed work. It was also noted that, while the project efforts would be concentrated on problems of the motor-impaired (due to funding and logistical constraints), this project would seek, and act as a reference point for, other similar standardization efforts. It was noted that, in many cases, the problems and solutions were directly related to each other and needed to be coordinated where

other efforts existed.

Those interested in the project should note that the project structure is an open one based upon participation, and hinged on a four-level involvement structure. Level I is the task force, which comprises key people from the United States, Canada, and abroad who are interested in tackling the problems and generating the solution strategies. Level II is represented by individuals interested in contributing to the effort and in evaluating the results in a very direct way.

Level III consists of individuals interested in tracking the results of the projects (and helping where they can). Level IV is composed of those individuals who are interested in the major results of the project as they are achieved.

Information is disseminated to individuals depending upon their level of interest and involvement. Limited financial support is available to help compensate the effort of those interested in working on this problem. Individuals are not selectd for participation at any level, including for the main task force: members of the task force are defined simply as those members who are actively working at that level. Members of the task force at the present time are:

Tom Grove, Basic Telecommunications
Andrew Thomas, Tufts New England Medical Center
Larry Weiss, Zygo
Gregg Vanderheiden, Trace R&D Center
Anne Heintzelman, Trace R&D Center
Judy Montgomery, Plavan School
Andre Bonderman, Plavan School
Armand DuFresne, DUFCO

Anyone else interested in participating, at any level, please contact the project base at the Trace Center. All manufacturers are automatically included in the information dissemination (at Level III by default), since constant review and input from manufacturers is essential to the overall success of the project. Many manufacturers are also involved on the upper levels ■

Conference Title:

CONSIDERATION OF STANDARDS FOR COMPUTER SENSORY AIDS FOR THE HANDICAPPED

Chairman: Gregory L. Goodrich, Ph. D., Research Psychologist, Western Blind Rehabilitation Center, VA Medical Center, Palo Alto, California.

February 11, 1980

Introduction

In the past 3 years, the potential ability of a handicapped person to process information has been dramatically improved. The roots of this phenomenon are in the development of commercial computer systems and their application at virtually every level of society. These applications have had an undeniably beneficial effect, but they have also led to some uniquely frustrating and costly situations. The present report contains the results of a meeting held to consider one area of frustration: the lack of standardization in computer sensory aids.

There is little need to document here all of the frustrations that have occurred. It will suffice to discuss the concept of "compatibility", which in its simplest form can be defined as the ability of one computer to communicate with another computer. Communication can occur between computers of vastly different size, complexity and function. However, that communication is dependent upon each computer sharing a large number of similar characteristics. For example, each must transmit data at identical speeds, using the same language. Each must have the same physical connectors. Lacking any level of compatibility, communication cannot occur.

In the computer industry there exist several standards or "rules" for connecting computers. From these rules one can generally decide if communication will be possible between any two given computer systems. All computers are not mutually compatible, which frustrates users. Such frustration is minimized because an industrial firm, institution, or individual tends to buy computers of one brand, which generally assures compatibility. The level of frustration can become acute, however, when a need arises to have a general-purpose computer communicate with a variety of other computers.

In the rehabilitation field, several examples of such incompatibility already exist. The ELINFA Digicassette and the Telesensory Systems Versabraille are computer-based devices designed to allow a braille user to store and retrieve information rapidly. They can also be used to communicate with some commercially available computer systems; that is, they can act as "smart" terminals. But a Digicassette user and a Versabraille user cannot communicate directly with each other, even though both devices are designed for essentially identical functions.

The VA recently installed a computer system for Veterans Benefits Counselors. This system, labeled the TARGET system, uses a large central computer at Hines, Illinois, to store records of veterans eligible for benefits. Access to the information is through numerous remote terminals at VA offices scattered throughout the country. Many of the counselors needing information stored on the system are legally blind. They could (theoretically) access the TARGET system through a Versabraille or Digicassette or a variety of other computer devices including a terminal with synthetic-speech as its output medium. In practice this is not the case because the RF signal sent from the central computer at Hines apparently cannot be converted into a form usable by any other existing computer system. The signal is essentially a picture, not coded information, and can be used only to generate a picture on a cathode ray tube (CRT). (A

costly specialized reading machine would be the blind individual's only means of accessing TARGET, it seems.)

As computer aids designed for the handicapped become more numerous, the possibility of similar incompatibilities increases. The purpose of this meeting was to provide a forum allowing a number of experts in the field to discuss the variety and type of standards which might be developed to help minimize frustration and maximize computer/sensory-aid compatibility.

Computer Industry Standards

In the computer industry, there are no universal standards. It is important to realize that this lack of standards occurs for a variety of valid reasons, which include design characteristics that optimize a particular function of a system. There are also economic determinants. The size of the computer industry allows this variety of standards to exist, but there are pressures, even within an industry of this size, to at least minimize the variability. These pressures have resulted in a situation that may be classed as having three general standards (although in reality this is a gross oversimplification). The three are: RS-232/ASCII[a], the system used by IBM, and that of Hewlett-Packard. The rehabilitation field currently holds the position that—if it is to continue producing computer sensory aids—it must either produce aids which meet one of these standards (to gain compatibility) or produce devices which are relatively single-purpose, non-compatible aids. The optimum situation would be to produce a universal communication method. As stated by Geraldine Lawhorn (in Courage to Rule One's Life, Journal of Visual Impairment and Blindness, January, 1980, 74(1), 37–9) "The advantage of universal communication methods is that they can be used immediately." Unfortunately, such a "universal" method is not now possible for sensory aids and computers.

General Considerations

Given the presence of multiple standards, and the low probability that a universal standard might be developed, the meeting participants began examining those aspects of computer sensory aid design which would require decision-making if an aid were to be made compatible with another aid or with a computer.

Time was lacking for a complete exploration but a worthwhile beginning was made. Figure 1 graphically represents some of the major decision levels involved in the interfacing of aids or computers. The figure shows seven levels and the model can be read as two individuals (users of aids) in adjacent buildings. The users might want to communicate with each other, or individually might want to access information stored in the other's building (computer).

Given the proximity of buildings and a need for only a limited interchange, the two users could merely open windows and talk directly. If distance or amount of information prohibit, an alternate communication method must be found. Using the building analogy of computers as the framework of this proposed conversation, each user must then send inquiries or information from the top floor of his/her building to the other's building, either to the top level (user floor) or to the level containing the desired information.

The computer model, at this point, has some structural differences from the usual conception of a building. Unlike buildings with a single stairway between floors, the computer model states that there will be multiple stairways, their number being dependent upon the number of possible choices presented by the type and complexity of the particular level. For example, to travel from Level V (Data Rate Level) to Level VI (Interface Standards Level) there are a minimum of 13 stairways—one stairway for each possible data transmission (baud) rate. In addition, the computer model requires that the choice made at each level be duplicated in the other building (computer). Thus, each building contains a maze of stairways with a basement filled with a maze of tunnels (physical connectors or plugs between computers) and the user is required to traverse the exact same route into the other computer as was used in traveling out of his/her own computer. Any deviation from the identical route prevents communication.

Each level, as can be seen from Figure 1, contains numerous choices. The number of combinations possible can quickly become astronomical (since one choice from many is made at each level). In the absence of standards, the sheer number of choices would make communication between computer sensory aids impossible.

It should be noted that the vast number of possible combinations exists for the computer industry as a whole—not just as, for the development of computer sensory aids. Among the factors which tend to reduce the number of combinations to a level which permits some communication are the three standards commonly employed in the industry, and the availability of some flexible hardware (e.g., variable-Baud-rate settings on some computers).

There appeared to be a consensus among those at the meeting that computer sensory aids could be developed which would have some general communication ability. That is, the sensory aids could have some communication with other sensory aids, and with other computer systems. Building the greatest flexibility into these aids would be desirable to users because it would increase communication possibilities and possibly also minimize cost in some real sense.

[a]American National Standards Institute, Inc.
1430 Broadway
N.Y., N.Y. 10018

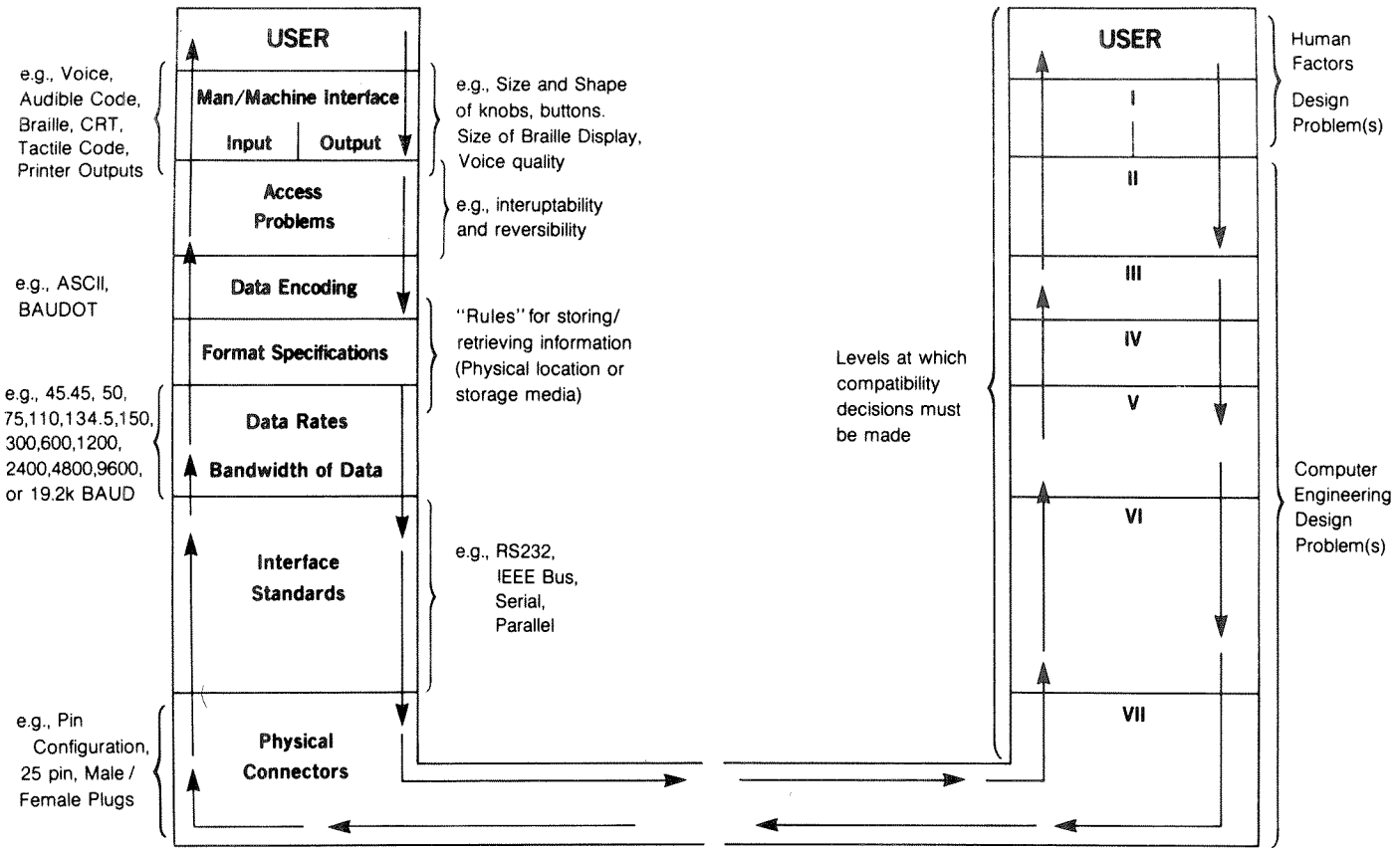

FIGURE 1.
Conceptual diagram of levels of computer sensory aids requiring compatibility. The user is depicted at the highest level, with information flowing from the top to the "basement" of each building. The basement level represents the physical connection between the two computer systems, in this analogy.

Some Factors to Consider

It is probably not possible, at present, to say what the maximum flexibility of any single computer sensory aid will be. First, the degree of flexibility needed for any computer system may be determined by its function; some aids will need less communication flexibility than others, and including less flexibility into such a system will be a cost-effective alternative. Second, as computer technology progresses, some means of producing a "black-box translator" (which automatically converts one language—or standard—to any other, may be developed). Such technology, in limited form, already exists. Third, the cost/benefit ratio of flexible computer sensory aids is not yet known, but surely will have an effect on the production and marketing of these aids. The development of an aid with all possible options will (probably) drastically raise its price, and it might be preferable to have a more limited device offering sound but only basic performance. Despite these uncertainties, the meeting participants were able to enumerate a number of the major areas of concern. This listing should be useful in future considerations of computer sensory aids. The list is incomplete; it was obvious that the limited time to consider the topic was as much of a limiting factor as was the topic itself.

RECOMMENDATIONS

Level I—Man/Machine Interface

a. The possible display modes for computer sensory aids include CRT (both standard and large print), print, and hardcopy braille, refreshable or paperless braille (single-cell braille, single-line braille, and full-page braille), tonal codes (from Optacon or as a signal mechanism), and synthetic voice (spelled speech or full speech). While all are technologically possible, little is yet known concerning the optimum display mode(s) for particular applications; for example, how best to tell a blind user the cursor position. Further research needs to be conducted in this area.

b. Computer sensory aids should avoid discriminating against individuals. That is, an aid designed for the blind should also be usable by a sighted individual, or an aid for the deaf should be usable by a person with a speech impairment. If such

capacity is not provided the device should clearly indicate the limits of its intended applications.

c. Users may input information to a computer through braille devices or typewriter-like keyboards, and direct voice input capacity is being developed. These options need to be explored to determine optimum application areas, and caution needs to be exercised to make them as universally usable as possible (i.e., non "discriminating").

d. For each control input made by the user, sensory feedback perceivable by the user must be provided. The user should have the option of suppressing the feedback.

e. Labels (of whatever sensory modality) on controls should be unambiguous to an unsophisticated user.

f. The system must be self-protecting so that no user input is capable of "crashing" the software or causing it to "hang". (A "reset" or "re-boot" switch is not adequate self-protection against system "crashes".)

g. A "reset" or "re-boot" control must be provided in the event of a system failure that is not user-induced.

Level II—Access Problems

a. Command sequences to access the computer sensory aid must be both interruptible and reversible.

b. As a minimum, any inappropriate control input by the user which would not otherwise result in any system response should be followed by a system message to the user—explaining that the input was not appropriate. (To the extent possible, such messages should give helpful hints about inputs that would be appropriate for the given situation.)

c. The wording of messages used for b. above (and all system messages) must be unambiguous. Further, the messages must not give wrong information. For example, it is better for the aid to say "I don't understand that" than to say "Disk Drive Select Error" when what really occurred was that the user used the symbol for disk-drive peripheral, and the naming conventions for tape-drive units, in issuing a system command.

Level III—Data Encoding

A number of encoding languages are available, including ASCII and Baudot. ASCII is currently used in several sensory aids for the blind, while Baudot is used in communication aids for the deaf. Others are used in the computer industry in general, although ASCII is also widely used there (except by IBM and Hewlett-Packard). Given these considerations, and in the absence of a universal translator, ASCII is probably to be preferred in future developments.

Level IV—Format Specifications

Formatting is often determined by the function of the computer (i.e., the job it is to perform) and may vary widely between computers. For example, the Digicassette and Versabraille have incompatible data formats. It is unlikely that standards can be applied at that level. However, perhaps developers should consider some means of dumping information from one sensory aid to another, without regard to format. Computer functions such as search and random access would be lost, but the dumped information could be obtained. The potential user of the data would have a difficult time sorting through the information, but it would allow rudimentary communication between computer sensory aids.

Level V—Data Rates

Figure 1 lists 13 baud rates (signaling speed rates) currently used for a variety of purposes, and this list may be incomplete. A rate of 45.45 is used for some Baudot TTY devices for the deaf, while 110 is used in other TTY devices. 134.5 is sometimes used in IBM computers, and 300 is common for telephone modems and CRTs. Many peripherals use either 2400 or 4800 baud. The limit for RS-232 applications is 9600 baud. (Large-batch information is frequently transmitted at 19,200 to reduce the length of time necessary to complete data handling.)

It therefore appears that no single baud rate would be adequate. An aid that accepted a variety of baud rates, and allowed the user to set the rate easily, using the control panel (not by internal switches) would seem to be very cost effective if other details allowed the baud-rate flexibility to be usefully exploited.

A possible range for such an aid would be from 45.45 to 4800 baud, or the latter rate might be 9600. The 19.2 transmission rate seems unlikely to be used often, but future sensory aid technology might change that.

Level VI—Interface Standards

As previously noted, three standards are now commonly used (ASCII, IBM, and Hewlett-Packard). Development of a universal interface "black box" seems possible and highly desirable, but until this occurs the RS-232 standard seems the preferred option.

Developers could also give consideration to installing both serial and parallel ports on devices, because while RS-232 standards are preferred, manufacturers should also realize that a demand will exist to access IBM and H-P equipment, and provisions to meet that demand would be beneficial.

Level VII—Physical Connectors

a. Null modems can be constructed to permit a variety of pin and plug configurations to be mated to other configurations. While inexpensive and relatively easily made by trained personnel, such modems could be an almost insurmountable problem to novice (or even experienced) users. Provisions should be made to have the necessary technical designs readily available. An optimum solution might be to have the VA and/or RSA rehabilitative engineering centers provide the modems (at cost) for any handicapped user needing them.

b. Developers should consider having dual male and female input-output (I/O) ports installed, to minimize the need for making special interface plugs.

c. Extensive consideration should be given to designing plugs which can be easily installed correctly by the blind or by people with limited manual dexterity. The current plugs on the Kurzweil Reading Machine, Model 3, for example, are difficult to install and may be damaged by a blind individual who turns the cable instead of the locking collar.

d. The 25-pin D plugs have much to recommend them (in terms of available connectors) and are available in 50 pin-sizes. The major limitation of these is the difficulty a visually impaired person may have in determining the top/bottom orientation of the plug.

Recommendations for All Levels

All computer sensory aids should come with extensive readable documentation in appropriate formats (e.g., print, large print, braille, and cassette).

The devices should be largely self-diagnosing of faults and should offer easy user maintenance and repair. They should retain partial functioning even when one function or peripheral is temporarily damaged.

The devices should also meet or exceed all conventional safety standards.

Summary

It is hoped that the information presented here will be the basis for further explorations of the problem. In those explorations the participants of this meeting hope that it will be kept in mind that denial of access to information is as damaging to the handicapped as is denial of access to buildings. It does little good for one to access any building, if the information sought cannot be gathered there. In that regard, our model of computer sensory aids as two adjacent buildings is very appropriate■

Contributors to the report:

Western Blind Rehabilitation Center, VAMC, Palo Alto: Dr. Gregory L. Goodrich (chair).

Department of Electrical Engineering, Stanford University: Dr. John Linville, Dr. Martin Morf, Dr. John Gill, and Mr. Greg Fowler.

Telesensory Systems, Inc., Palo Alto: Dr. Noel Runyan.

Rehabilitative Engineering Research and Development Center, VA Medical Center, Palo Alto: Dr. Sally Wood, Dr. John Eulenberg, and Mr. Dave Jaffe.

Psycholinguistic Research Associates, Inc., Menlo Park: Dr. Carol Simpson and Dr. Doug Williams.

INTERNATIONAL STANDARDS ORGANIZATION

Technical Committee 173
(for technical systems and aids for disabled or handicapped persons)

May 28-30, 1980 in Stockholm, Sweden

The first meeting of this committee was held in Stockholm on May 28-30, 1980 with representatives from seven countries. The secretariat for ISO/TC 173 is provided by Sweden, with twelve countries participating in the work, and another twenty countries acting as observing members. The delegations present agreed to submit to the Planning Committee of ISO (PLACO) for approval the following proposal for the title and scope of ISO/TC 173:

Title: Technical systems and aids for disabled or handicapped persons

Scope: Standardization in the field of technical systems and aids for the physically or mentally disabled or handicapped persons

Exclusions: Systems or aids that are dealt with by other technical committees such as access to means of transport (ISO/TC 8, 20, 22, 177), building construction (ISO/TC 59), furniture (ISO/TC 136), implants for surgery (ISO/TC 150), ergonomics (ISO/TC 159), prosthetics and orthotics (ISO/TC 168), ophthalmic optics (ISO/TC 172), electrical safety (International Electro Technical Commission IEC/TC 62) and hearing aids (IEC/TC 29).

It was also agreed to ask the ISO Council to request that the TCs in their work devote special attention to the needs of handicapped and disabled persons. Furthermore it was decided that, if agreed by ISO/TC 136, the work on wheelchairs should be transferred from TC 136/SC 8 to TC 173 and a subcommittee should be set up for this purpose. Work should also be started in the fields: classification and terminology, aids for ostomy and incontinence, aids and adaptations for communication as well as systems and equipment for integration at home and in society (including professional activities) and sub-committees should be set up for these subjects. The next meeting of ISO/TC 173 will be held towards the end of 1981.

Note: The above account is taken from ICTA Inform, the newsletter of the International Commission on Technical Aids, Housing, and Transportation.

ANSI Revision:
AMERICAN NATIONAL STANDARDS SPECIFICATIONS

(for making accessible environments usable by physically handicapped people)

Approved March 3, 1980

After prolonged effort and much discussion, the American National Standards Institute approved March 3, 1980 ANSI A 117.1-1980, a revision of ANSI A-117.1-1961, which had been reaffirmed in 1971. It is entitled American National Standard Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People. The large committee

representing many societies, rehabilitation associations, and government agencies had Timothy J. Nugent, University of Illinois, as Chairman and Edward Steinfeld, State University of New York at Buffalo, as Secretary.

The new edition is greatly expanded. Numerous figures and mandatory specifications describe specific situations. An appendix of background information has been added to help the designer to understand minimum requirements.

Single copies may be purchased for $5.00, from ANSI, 14-30 Broadway, New York, N.Y. 10018. There are reduced prices for quantity purchases.

INTERNATIONAL STANDARDS ORGANIZATION
Technical Committee 168
(for consideration of limb prosthetics and orthopaedic bracing)

Chairmen (three working groups): see text

January through **April, 1980.**

Upon the recommendation by a Task Group formed by Technical Committee 150 (Orthopaedic Surgery) of the International Standards Organization, the ISO created Technical Committee 168 for consideration of limb prosthetics and orthopaedic bracing. The inaugural meeting of TC 168 was held May-June 1979, in Pforzheim, Germany. Delegates from the United States were A. Bennett Wilson, Jr., and Jack Hendrickson.

At the inaugural meeting three Working Groups were created: WG-I to consider nomenclature and classification systems; WG-II to consider standards concerning medical and surgical matters; and WG-III to consider testing and evaluation. A. Bennett Wilson, Jr., George Murdoch (Scotland), and Wilfred Krieger (Germany) were asked to serve as Convenors (chairmen) of the three groups, respectively.

The first meeting of WG-III was held in Berlin in January 1980. The first meeting of WG-1 and WG-2 was a combined meeting which was held in St. Andrews, Scotland, April 26 - 28, 1980.

Most of the current nomenclatures and classification systems and some of the current efforts in compiling definitions and glossaries in prosthetics and orthotics were reviewed, and an organization chart outlining the needs in the field was developed.

The latest revision of the Terminology for Classification of Limb Deficient Children was presented by Drs. Henkel and Willert of West Germany. It was recommended that this revision be adopted as a standard for international use and that it be known as the Kay system in honor of the late Hector W. Kay, for his untiring efforts in the development of this scheme when he was associated with the Committee on Prosthetics Research and Development.

A scheme for assessment of the activity level of lower-limb amputees, developed by Dr. H.B.J. Day (England) as part of an ISPO project to arrive at structural standards for artificial limbs, was reviewed carefully. It was recommended that the method be tried on a systematic basis at other centers throughout the world. If the technique proves to be valid, its use should be very helpful in improving the prescription process.

The participants concluded by suggesting that the next meeting be held in conjunction with the 1980 World Congress in Prosthetics and Orthotics in Bologna, Italy, September 28 - October 3. Meanwhile two subgroups, one to handle prosthetics, the other, orthotics, will be formed to make whatever progress can be effected by mail and telephone.