

THE WHITE HOUSE
OFFICE OF DOMESTIC POLICY

CAROL H. RASCO
Assistant to the President for Domestic Policy

To: _____

Draft response for POTUS
and forward to CHR by: _____

Draft response for CHR by: _____

Please reply directly to the writer
(copy to CHR) by: _____

Please advise by: _____

Let's discuss: _____

For your information: _____

Reply using form code: _____

② File: MICROSOFT *KRST*
10/10

① Send copy to (original to CHR): Stan, Jeremy, [unclear]

Schedule ? : Accept Pending Repeat

Designee to attend: _____

Remarks: Greg was meeting w/
Microsoft official on another
topic, this memo prepared
for him to use in
bringing this up as additional topic

OCT 4 1994

September 27, 1994

MEMORANDUM FOR GREG SIMON

FROM: MICHELA ALIOTO

RE: MICROSOFT INACCESSIBILITY FOR BLIND PEOPLE & PEOPLE WITH VISUAL IMPAIRMENTS

MicroSoft Corporation has developed Window-based software that is inaccessible to people who are visually impaired or blind. On August 22, the National Council on Disability (NCD), a Presidential appointed commission, invited Bill Gates and other policy making MicroSoft officials to a meeting in Seattle to discuss the inaccessibility of MicroSoft Windows and to work towards an acceptable solution to this problem. The meeting was a great disappointment to the Council and generated tremendous concern about the progress MicroSoft is taking in building accessible routes for blind people down the NII.

BACKGROUND

Over the past decade, people who are blind have enjoyed a new renaissance of information access. This has been chiefly due to the widespread availability of adapted technology such as synthesized speech, electro-mechanical braille, and screen magnification systems. The online world has also offered much to those with vision impairments, but further developments on the NII and the Internet have the potential to exclude these same people from the information that is currently accessible to them.

One of the most severe dangers is with MicroSoft software. Presently, blind and visually impaired people lack access to Windows and other graphical user interface (GUI) operating systems that are rapidly becoming the dominant computing and information links. As you well know, MicroSoft remains the leader in GUI based technology and for this reason it is very important that the equipment that they produce is accessible for all people, those who are blind or have visual impairments in particular.

In a struggle to rectify the problem of inaccessible software and to ensure that as the NII is constructed it is accessible to all people, the NCD, on August 29, sent another letter to Mr. Gates inviting him and high ranking MicroSoft policy makers to yet another meeting to discuss the same issue. At this time a date has not been suggested nor has MicroSoft responded.

PROBLEMS & AN EXAMPLE OF THEIR RAMIFICATIONS

The NCD's fear is obvious -- an NII constructed without full access for visually impaired or blind people permanently disenfranchising these citizens from the mainstream of community life.

People are already beginning to lose their jobs and/or deserved promotions as a result of inaccessible software. A number of personal testimonies have been attached however one that deserves mention is a blind man, whom I will refer to as George, who works as the Alumni Database Coordinator at one of the Ivy League Universities.

This university is in the process of moving towards standardizing Windows and are using MicroSoft Access for database development -- one of George's responsibilities. Because they have decided that MicroSoft Access is the best new data base for them, and due to the fact that George cannot use MicroSoft Access, he will be unable to work on the new system. Amazingly enough, this university went so far as to point out that if there were technological developments with MicroSoft Access that would make this system accessible to George, he would be contributing to this new data base system.

However, the bigger problem lies with "high-tech catch-up." By the time a package becomes accessible it is already outdated. The steady flow of new graphic applications and Windows operating system enhancements do not include standard hooks for tying into braille, speech output, or other adaptive systems. This leaves blind computer users waiting months, even years for access to widely used Windows-based packages. And, each time a new version is released blind individuals must wait again for the updated adaptive software.

On the other hand, a number of modestly capitalized third-party software and hardware companies who specialize in computerized accessibility products, are completely restricted by application mapping problems within Windows software. The primary source of these problems are the multiple program interfaces that commercial developers randomly build into mainstream Windows-based packages. One of the primary problems is that so many applications programmers, like MicroSoft, do not use the standard application programming interface (API) already in Windows.

NCD RECOMMENDATIONS FOR MICROSOFT

The NCD presented MicroSoft with a number of different recommendations on how they could begin to implement a system of product development that would ensure equal access for blind and visually impaired people to their software. NCD recommended the following 6 steps:

- 1). **Institute a company-wide accessibility policy that includes a commitment to make all MicroSoft products accessible to people with disabilities.**
In some cases, accessibility to all kinds of users will not be possible because of the nature of the product -- for example a painting program for blind people. However, if accessibility is presumed to be a requirement at the design stage such products will be the occasional exception. To ensure this, the accessibility policy needs a monitoring and enforcement mechanism within the company.

- 2). **Establish an accessibility programming team.**
These programmers would design the means by which MicroSoft software could be made accessible and usable by people who are visually impaired or blind.
- 3). **Impose accessibility requirements within the Windows operating systems.**
Just as developers of Windows applications have to conform to other standards in order to create Windows-compatible applications, they should also have to comply with accessibility standards in order to be Windows-compatible in name and product.
- 4). **Develop a cadre of beta testers with disabilities.**
These individuals would be among the first to receive test versions of MicroSoft products.
- 5). **Hire a quality control staff with disabilities.**
These employees would be able to perform internal, alpha tests of MicroSoft products before their release.
- 6). **Postpone subsequent versions of Windows until they are accessible to people using braille, speech and large print outputs.**
MicroSoft can reverse the unfortunate trend of delayed access by planning for the "Chicago" version of Windows and the "Cairo" version of Windows NT to be truly accessible upon initial market release. All future MicroSoft products should meet the same access guidelines.

ADMINISTRATION REQUEST

As mentioned earlier, the NCD has sent Bill Gates a second letter asking for a meeting with him and high ranking MicroSoft policy makers. Because the NCD has the full backing of the Administration, it is important to us to see the NCD and MicroSoft work together to progress through the computer age. In order to facilitate this, we ask for the following:

- ✓ That Mr. Gates and other high ranking policy makers sit down and meet with the NCD to discuss Windows accessibility for blind people;
- ✓ that MicroSoft seriously reviews and considers the NCD recommendations;
- ✓ and that the NCD and Microsoft reach a compromise on this issue and begin a working relationship.

The NCD proposal will give MicroSoft the opportunity to champion the next "civil rights hurdle" of this century while setting a precedent throughout the developing High-Tech community on how to conquer the ethical road blocks that will inevitably come up. MicroSoft could set the tone on how the High-Tech industries intend to implement the theories and the ideas surrounding the ADA.

"Microsoft" - file
Inbox

Sent
Michela
0508 286
8/25
or

SOME PERSONAL TESTIMONIALS

August 22, 1994

My name is Jamal Mazrui. I am a blind person who works as the Alumni Database Coordinator at Harvard's Kennedy School of Government. The school is moving toward standardizing on the Windows environment in general and on MicroSoft Access for database development--one of my job responsibilities. For the past month, I have intensively researched Windows screen readers and their compatibility with various applications, including MS Access. I spoke with every developer of a commercial Windows screen reader, with several adaptive equipment trainers, and with many users. As the founder and director for six years of the Boston Computer Society's Visually Impaired and Blind User Group (VIBUG), I used every contact I could to learn what might be available to me as an accessibility solution to my job challenges. I concluded, to my dismay, that no solution currently exists, and there is little hope for one in the near future unless urgent action is taken. The American Council of the Blind, a major consumer organization of blind people, sponsored my trip to this meeting to bring this message.

The following is a notice I sent out over the Internet in preparation for this meeting, and some responses I received in a day:

A delegation organized by the National Council on Disability will be meeting with MicroSoft at its headquarters on Monday, August 22. The main topic will be access to the MicroSoft Windows operating environment by people who are blind or visually impaired. I am collecting testimonials to forward from blind persons like myself whose careers have been adversely affected by inadequate speech access to this graphical user interface. Please send me e-mail or faxes (preferably on corporate letterhead) as soon as possible.

Jamal Mazrui
Alumni Database Coordinator
Kennedy School of Government
Harvard University
Phone: (617) 495-1433
Fax: (617) 496-4511
E-mail: jamal@ksgdfs.harvard.edu

From: david_basden@csufresno.edu (David Basden)
Subject: Windows Access Woes
To: jamal@ksgdfs.harvard.edu
Date: Fri, 19 Aug 1994 13:49:10 -0700 (PDT)

I am a blind professor at the Psychology Department here at California State University, Fresno. I have been

teaching the Computer Applications to Psychology course for the past 10 or 12 years. I have had no problem performing my duties using MSDOS, but I am falling behind now that Windows has become the dominant operating system. Although there are several attempts at Windows screen-readers on the market, none is really satisfactory. Most hang frequently and don't really provide good access to what is on the screen.

I have managed to get by using MSDOS in the past because the California recession has kept us using older equipment with MSDOS. I will be teaching from a new lab this fall, however, which will be a Windows-NT lab. Several new screen-readers for Windows will be on the market shortly, but perhaps not in time for me. I am also dubious about their being any better than existing software. The problem is that Microsoft has not taken the blind computer user into consideration when designing its software. It would be fairly simple to provide hooks into the system for screen-reader programmers to use in designing their applications for blind access. Microsoft seems uninterested in accomodating the blind community, however.

I am far from the only blind computer user who feels disenfranchised by Microsoft's move to the Windows environment. The blind community was beginning to feel we had some modicum of equality in computer use over the past decade, but that has been taken away. This is doubly frustrating because it would be so easy to accomodate the blind community if it were made a priority.

David R. Basden, Ph.D.
Professor, Department of Psychology
California State University, Fresno
Fresno CA 93740-0011
Email: davidb@zimmer.csufresno.edu

Date: Thu, 18 Aug 94 13:38:48 EDT
From: VCOOK@VTVM1.CC.VT.EDU
Subject: Re: Testimonials needed!
To: Jamal Mazrui <JAMAL@KSGDFS.HARVARD.EDU>

Let me know if you would really prefer something on a Virginia Tech letterhead.

With colleagues moving to Windows applications altogether, I have much more trouble exchanging documents with colleagues than I used to. Virginia Tech is a Microsoft Word campus, especially Word for Windows. Thus, no one is using Wordperfect for Dos any more, unless they are unwilling to switch to the Windows environment. Given the great things I hear about Microsoft Works, I would like to have easy access to it.

Virgil A. Cook VOICE 703-231-6568 |
DEPARTMENT OF ENGLISH FAX 703-231-5692 |
Virginia Tech E-MAIL- |
WILLIAMS HALL INTERNET: VCOOK@VTVM1.CC.VT.EDU |
BLACKSBURG, VA 24061-0112 BITNET: VCOOK@VTVM1.BITNET

Date: Fri, 19 Aug 94 13:50:38 EDT
From: VCOOK@VTVM1.CC.VT.EDU
Subject: Re: Testimonials needed!
To: JAMAL@ksgdfs.harvard.edu

The point is that discussions on the BLIND-L list and the Blind News Digest indicate that Windows-based screen readers are very poor. A friend at the Department of Defense, who works with DOD's blind, computer users, tells me that I shouldn't get a Windows reader until I absolutely have to. She went on to say that it should be ScreenReader 2 if I bought one. The point is that few of us have the option of trying out such software before we buy it. You can't go down to your friendly computer store at the mall and try something before you buy. If you do not attend either the ACB or NFB conventions, you stand almost no chance of being able to try out one of the Windows readers. Microsoft may make the argument that you predict, but the argument is totally invalid. Until Microsoft does whatever is necessary to enable developers to write and refine a satisfactory Windows-based screen reader, we are all second-class citizens in the workplace on yet another count.

Perhaps I should be replying to BLIND-L instead of you so that Greg Lowney would see my comments. Some good Microsoft bashing on the list might give him some good, indigestible food for thought.

Virgil A. Cook VOICE 703-231-6568 |
DEPARTMENT OF ENGLISH FAX 703-231-5692 |
Virginia Tech E-MAIL- |
WILLIAMS HALL INTERNET: VCOOK@VTVM1.CC.VT.EDU |
BLACKSBURG, VA 24061-0112 BITNET: VCOOK@VTVM1.BITNET

Date: Thu, 18 Aug 94 11:43:16 CDT
From: dgardner@hsvaic.hv.boeing.com (Duncan Gardner)
To: jamal@ksgdfs.harvard.edu
Subject: re: Testimonials needed!

> I am collecting testimonials to forward from blind

> persons like myself whose careers have been adversely affected by

Let me put it to you this way; as a program (both applications and systems) I have had the displeasure of HAVING to use Micro\$oft products. I avoid them like the plague whenever possible.

As far as Windows is concerned, I am appalled that all those programmers have not been able to figure out SOME methodology for hooking for speech; yes, it IS a graphical interface, but it is ALSO an icon based system, there's about five ways *I* can think of that Micro\$oft could adapt the system for use by the blind and visually impaired.

Because I am fortunate enough to have some sight, I work exclusively with command-line interfaces (preferably *NIX, but also DOS) and use either large fonts or screen enlarging software. As my sight deteriorates (and as time allows) I will be getting more involved in designing X-Window interfaces for speech access. Micro\$oft windows, by then, will be unaccessible and unacceptable to me as a viable operating interface.

Forgive the rants, but I think you may be wasting your time with Gates and his crowd; unless they see a buck, they won't help.....

duncan gardner

Date: Fri, 19 Aug 1994 09:49:37 -0600 (CST)
From: "Jon Gunderson" <jongund@uiuc.edu>
Sender: jongund@ux1.cso.uiuc.edu
To: jamal@ksgdfs.harvard.edu
Subject: RE: Testimonials needed!

I am not blind, but we do have blind staff at the Rehabilitation Education Center. One of the problems that we face is the development of a student services database for Windows using Paradox. One of the concerns is access to the database by students, staff and faculty with visual impairments. Another concern is a general concern on the UIUC campus for students with blindness. Most of the new software that is available on campus is all GUI oriented. While there are still character equivalents for many programs, this option will not be available for ever as character based versions are premenantly replaced with GUI versions.

Just one note. I would emphasize having access to GUIs with the same or nearly the same usability as a sighted version. The usability issue is more than just making something talk or

output dynamic Braille. Usability focuses on what is presented and control over presentation. I think this is an important issue and Microsoft needs to understand accessibility is more than making something talk. I could send you a paper I wrote on the topic I you are interested.

Jon

Jon R. Gunderson
Visiting Assistant Professor
Division of Rehabilitation Education Services
1207 S. Oak Street, Champaign, IL 61821
EMAIL: jongund@uiuc.edu VOICE: (217) 244-5870 FAX: (217) 333-0248

Date: Fri, 19 Aug 1994 16:01:00 -0500 (EST)
From: Elizabeth Hamilton 556-1419
<Elizabeth.Hamilton@UC.Edu>
Subject: Testimonial
To: jamal%ksgdfs.harvard.edu%external@beta.uc.edu

I am the coordinator of library services to print handicapped people here at the University of Cincinnati. We installed a 486 in our lab equipped with screen enlarger and speech and have had the thrill of watching students who have never done their own research access the library's catalog, reference databases and Internet resources. I am a great fan of Windows due to its multitasking and task switching capabilities but I hope that if it and other GUI's take over that they will permit our students the same full access to print that they have now possess!!!

Elizabeth H. Hamilton
Library Disability Services
University of Cincinnati Langsam Library
Cincinnati, OH 45221-0033

elizabeth.hamilton@uc.edu

Date: Tue, 16 Aug 1994 19:44:58 GMT
From: Jeff Suttor <JSuttor@LIBRARY.UCLA.EDU>
Organization: UCLA Library Information Systems/Development
Subject: Microsoft's attitude towards adaptive access
To: Multiple recipients of list EASI
<EASI%SJUVM.BITNET@BROWNVM.brown.edu>

See the current Computer World, Aug 8, 94, p.1, for an article on the problems of adaptive access with Windows. Most distressing are the comments by Microsoft's sole staffer for disability & access. (Yep, that's right, one of the world's largest software companies has 1 and only 1 person concerned with these issues!)

Some excerpts:

"Just about every piece of software on the market today has been designed without an awful lot of thought to accessibility," acknowledged Greg Lowney, senior manager and sole staffer of Microsoft's accessibility and disabilities group.

But for now, Microsoft has no plans to implement standard access methods across the company's far-reaching product line. Individual business units will continue to develop products as they see fit, Lowney said.

"The primary problem is that so many applications programmers don't use the standard APIs already in Windows. Microsoft itself is one of the primary offenders" said Artie President Dale McDaniel.

Jeff Suttor

JSuttor@Library.UCLA.Edu

Voice: +1 310 206 5565 Fax: +1 310 206 4109

<URL <http://WWW.Library.UCLA.Edu/~jsuttor/jsuttor.html>>

Date: Fri, 19 Aug 1994 16:01:46 -0400 (EDT)

From: Paul Schwab <Paul.Schwab@UC.Edu>

Subject: Email from Andy Zingis

To: jamal@ksgdfs.harvard.edu

P6(b)(6)

P6(b)(6)

Home

(513) 55NOVEL Work

August 19, 1994

Mr. Jamal Mazrui

Alumni Data Base Coordinator

Kennedy School of Government

Harvard University

Dear Mr. Mazrui,

I am a software engineer at the University of Cincinnati in the Campus Information Technology Services department. I have been legally blind since early childhood but can still use large print. I have been working with computers since 1972. I love PL/I, FoxPro, BASIC and System Optimization. I am known locally as a microcomputer consultant, installer, repairman and user. I am currently in charge of the campus

wide microcomputer inventory, record keeping and reporting system.

Windows, Windows software and the GUI interface are all real "killers". Many programs have inalterable default color setting which make them inaccessible to me. Even the Zoomtext Plus Windows enlarging system is often useless because it only works in 16 colors with no capability of setting shades of color which might be less than full intensity. As far as I know there are no programs to enlarge Windows in 256 or more colors. If I were to loose the Plasma LC environment in Windows which yields a black background screen, I could not use Windows at all! This raises a fundamental question. Lets look at it.

IBM OS/2 and Macintosh both have built-in software to aid the visually impaired. OS/2 has a rather sophisticated voice input system; Macintosh has the built-in screen enlarger. The biggest and best software house for microcomputer operating systems, Microsoft, has NOTHING. This poses some interesting questions:

1. Does Microsoft lack the programming ability (staff, financial base, hardware or skills) to create a Windows enlarging low vision aid system?
2. Does Microsoft lack awareness of the need for such software?
3. Does Microsoft consider this field to be too insignificant or perhaps unprofitable?
4. Does Microsoft not care to get involved?

My thoughts on these questions:

1. Programmers, microcomputers, source code for operating systems and a long history of success and experience make the first answer a resounding NO. If anyone could do a nice screen enlarger for Windows, certainly the authors of the system could do so. Having nearly 100,000,000 copies in circulation makes the financial question mute.

2. There is an individual at Microsoft responsible for handicapped issues. There must be a large data base of questions and solutions which have been built up over the time he has occupied this position. I think it safe to say that Microsoft knows that the need exists.

3. It is unlikely that Microsoft has not noticed the large number of small companies fighting over the state funding for handicapped aids for computers. As small as the market may look, it seems to be growing not shrinking; there are

many products and, unfortunately, many individually developed standards and more on the horizon. I cannot imagine that given Microsoft's resources and internal knowledge a minimal effort should yield a tremendous amount of good publicity and resulting sales and support.

4. This seems to be the only explanation for a dismal lack of built-in tools for low vision users of Windows. There is also an audience of elderly computer users which is growing as our population ages. There are also public presentations which could greatly benefit from easily readable enlarged displays. My personal conclusion about the lack of help from Microsoft is that, yes, they care, but not enough to do much about it.

I hope, Mr. Mazrui, that these thoughts may give you some additional ammunition in discussing future software development plans with Microsoft. Since Microsoft chooses not to be involved in adaptive software development everyone else in the world lags 1 to 2 years behind and is usually upstaged by a new version or release. I want to emphasize that my lack of enthusiasm is not based on pessimism but rather observations of what I perceive to be reality. Advances in low vision technology seems to be driven by enterprising individuals rather than by corporations. This fact has forced me to learn a lot more than I would otherwise have thought necessary.

Thank you,

Andy Zingis



HARVARD UNIVERSITY
JOHN F. KENNEDY SCHOOL OF GOVERNMENT



79 JOHN F. KENNEDY STREET
CAMBRIDGE MASSACHUSETTS 02138

August 4, 1994

To:

From:

Re: Jamal Mazrui

Many thanks for your memo concerning the possibility of Jamal helping us in the Center with the creation of a new data base. He met with us twice, and was extremely helpful. Unfortunately, in our second meeting with _____ and others, it was determined that ACCESS is the best data base for us to use for the Center Working Paper Series. Sadly for us, Jamal is unable to use that software at the present time. He believes that through technological developments in connection with ACCESS, he will be able to help us in the future.

We are sincerely sorry that this did not work out as it is clear that Jamal has a great deal to contribute to the creation of a new data base. We certainly will be in touch if there are projects with which he can help us in the future. With many thanks for your help.

cc:

Jamal Mazrui ✓



NATIONAL COUNCIL ON DISABILITY

An independent federal agency working with the President and the Congress to increase the inclusion, independence, and empowerment of all Americans with disabilities.

August 8, 1994

Mr. William H. Gates
Chairman and CEO
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Dear Mr. Gates:

The National Council on Disability, an independent Federal agency led by 15 Members who are appointed by the President and confirmed by the United States Senate, has recently heard from a number of individuals who have expressed concern that Microsoft Corporation has developed Windows-based software that is inaccessible by persons who are visually impaired or blind. As you may be aware, the development of accessible computer technologies has enabled literally millions of people with disabilities to access employment and increased opportunities for self-sufficiency and independence for many years now. Naturally, the introduction of an inaccessible product is a cause of great concern among these individuals and those of us who are charged to provide national leadership in disability policy, in particular, the implementation of the Americans with Disabilities Act of 1990.

The National Council on Disability will be meeting in Seattle from August 22-24, 1994. I would be pleased to arrange for a meeting between you and other key policy-making Microsoft officials and the leadership of the Council at our conference site, the Westin Hotel, during this time. One opportunity for such a meeting would be on August 23, 1994, when we will be sponsoring an all-day "Americans with Disabilities Act Roundtable" at the Westin. Otherwise, we could arrange for a more mutually convenient time at either the Westin Hotel or some other location.

Let me emphasize that our intent in suggesting this meeting is to work toward an acceptable solution to this issue. We are very clear in our commitment to ensuring the expansion of employment opportunities for qualified individuals with disabilities. Thus, any development that might actually result in a *reduction* of employment opportunities gives us cause for great concern. We also understand that you wish to see the continued success of your corporation and the development of customer-responsive technologies in the computer industry. It is my belief that through

Mr. William H. Gates

August 8, 1994

Page Two

combining what we know about the needs of individuals with disabilities and the impressive leadership you have exercised in making Microsoft the industry leader that it is, we can hopefully achieve a just solution to this issue.

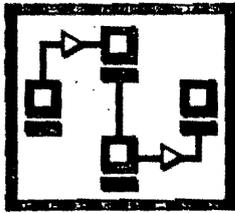
Please advise me as to your availability for a meeting regarding this matter at your earliest convenience. If you require further information, please contact either Ed Burke or Ramona Lessen at the address or communication numbers listed below. I do hope that we will be able to meet in Seattle in order to ensure that people with disabilities have the greatest access possible to your products, and, thus, to employment and increased independence.

Sincerely,

**Marca Bristo
Chairperson**

At a Note's symposium last week, Lotus Development Corp. detailed delivery dates — mainly in October — for the Windows NT and belated Unix versions of its Notes 3.1.5 servers.

The company also outlined a feature blueprint for Notes 4.0. Scheduled to ship in the first half of next year, it will be the first major upgrade to Notes in two years.



complaints about a complicated end-user interface, limited back-end management and scalability, restricted programmability and a need for better CC:Mail integration.

"We naively made the assumption that Notes integration with CC:Mail was easy. It's not," said Nancy McCarthy, director of technical support and operations for Notes, page 101

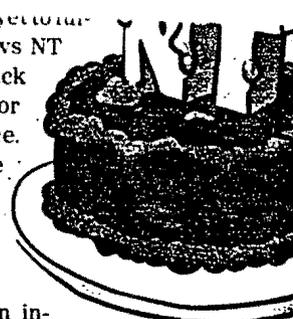
By Stuart J. Johnston and Ed Scannell

A year after Windows NT's release, Microsoft Corp.'s pre-eminent 32-bit operating system has fallen far short of its prerelease hype. Even so, Microsoft's penchant for sticking with a system until it succeeds bodes well for NT's long-term prospects, analysts said.

"I see NT as having a spectacular future.... It's just a matter of time," said Colin Carpi, president of Chartwell Advisory Services in Penn Valley, Pa., which is develop-

porate users has yet to fully deploy Windows NT because of the lack of applications or poor performance. But many more say they are gaining confidence based on the beta of Daytona and their own internal application development projects. Daytona is the code name for Windows NT 3.5, a sleeker, faster, more network-capable version of NT due out next month.

"Virtually every company we deal with in the insurance busi-



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Adaptive technologies

Computing for all

By Julia King

Thousands of blind and visually impaired computing professionals and their companies are caught in a costly and seemingly futile exercise in high-tech catch-up.

On one side of this scenario are commercial software giants such as Microsoft Corp., whose steady flow of graphical applications and Windows operating system enhancements do not include standard hooks for tying into software for braille, speech output and other adaptive systems.



Bell Atlantic's Dave Simpson waits months for updates

That leaves blind users such as Dave Simpson waiting months, even years, for access to widely used Windows-based business packages. And each time a new version is released, Simpson must wait again for updated adaptive software.

"Just when something comes out for us that should work with Windows, there's always something new. Now, for instance, it's the Chicago version of Windows," said Simpson, a database administrator at Bell Atlantic Corp. in Philadelphia.

Adaptive systems, page 24

Reorganizing IBM

IBM recasts server

By Jean S. Bozman and Michael Fitzgerald

As IBM continued to hack away last week at its corporate structure, information systems managers gave the effort lukewarm approval, saying they are far from optimistic about seeing any cost benefits soon.

"It remains to be seen whether they will pass those cost savings [from unified development] on to the customer," said Roy Dodd, MIS director at The Good Guys, Inc., a Brisbane, Calif., electronics retail chain.

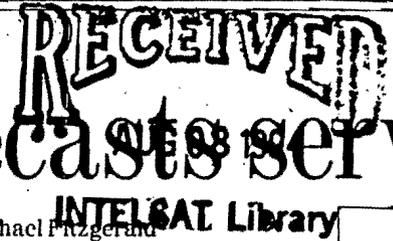
Common sense

IBM announced it will try to cut costs and speed development of its disparate server lines by building them out of common hardware components, including common microprocessors, memory units and subsystems.

IBM will use PowerPC chips to power AS/400, RS/6000 and PC servers and will use the same chip fabrication processes to make PowerPC and mainframe CMOS chips. Such an approach could give the company a cost advantage in servers because it will be able to design a system once and then reuse it in all server brands. In many cases, brand-specific components developed in the past will be discarded.

"Initially, I'd say this was positive," said Jan Scites, president of customer services at Connecticut Mutual Life Insurance Co. in Hartford, Conn. "I think it'll make them better at getting into the client/server world, but we'll have to see how it plays out."

IBM, page 101



Res
dwi

By Craig

IBM's mainfr.
Just gi
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Connecticut Mutual's Jan Scites hopes IBM's moves will aid its client/server efforts

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P O BOX 40
3400 INTERNATIONAL DR NW
WASHINGTON DC 20008-3006

...erage on the exchange plan to...
brokerage service portion as of April 1995.

"We had consultants in here who figured that what we wanted to do would run about \$30 million when all is said and done. It's not worth it," Kent said. Brokerage services brought in just \$6 million to \$7 million in annual sales, he added.

Board members agreed that modernizing IS is a must but balked at the bill. That estimate included software, hardware, training and consulting costs related to migrating both brokerage services and clearance systems.

Keeping clearance systems — applications that rec-

The Vancouver Stock Exchange's Jim Kent says the high prices he has heard from Sybase and Oracle for Unix databases have 'left me breathless'

9000 Series 800 servers.

Trading systems, meanwhile, will be untouched. Traders went fully client/server in 1990, with the installation of a Stratus Computer, Inc. fault-tolerant host feeding several hundred IBM PS/2 PCs. That system won a Canadian Information Processing Society's award for Canadian-made software.

Ironically, the same exchange that co-built that award-winning client/server application with TCAM, a

rooming change. If exchange employees are similar to other users he has coached, 5% to 15% of the exchange's 300 workers will not adapt and will leave the company, he said.

On the database side, both Sybase and Oracle have made bids for the exchange's business, each promising on-site consulting and migration help. So far, however, the high prices both vendors are asking have "left me breathless," Kent said. He declined to give figures.

Users have steadily named price as an increasingly critical feature in choosing a database for the past 10 years, according to a recent survey by Sentry Market Research.

Adaptive systems

CONTINUED FROM PAGE 1

On the other side are a handful of modestly capitalized third-party software and hardware companies such as Artic Technologies, Inc. in Troy, Mich. Like other firms in the specialized world of computerized accessibility products, Artic has been bedeviled by application mapping problems. The primary source of these woes are the multiple program interfaces commercial developers randomly built into mainstream Windows-based packages.

"The primary problem is that so many applications programmers don't use the standard APIs already in Windows. Microsoft itself is one of the primary offenders," said Artic President Dale McDaniel. "It leaves us pulling our hair out because we don't have enough hours or staff to take everybody's applications and write special drivers for them."

Playing catch-up translates into additional costs for corporations. This, in turn, can prompt internal political battles over who pays. At Federal Express Corp. in Nashville, officials have yet to decide how to distribute the costs of adaptive hardware and software used by nine customer service representatives who are blind or visually impaired.

"Economics is a major issue any busi-

ness needs to look at because [adaptive] equipment is not cheap," said Scott Hooker, a senior information planning analyst at Fedex. Hooker, who is blind, functions as a technical troubleshooter for the nine workers.

When blind employees are first hired, state rehabilitation agencies generally pay for adaptive equipment, Hooker noted. "But once the employee is no longer a client of that agency, the question is, where does the money come from to update their equipment?"

Looking for a money tree

At Bell Atlantic, disabled employees are furnished with the equipment they need to do their job, said Ginger Rogers, a job accommodations specialist in the human resources department.

"But human resources doesn't have a bucket of dollars where any person with a disability can come to us and we'll pay for it," Rogers said. "It's a departmental responsibility. If accommodation is going to allow an employee to do a job, [the department] is going to have to eat it."

Accommodation costs could be reduced greatly if software vendors used a standard set of interfaces in their commercial packages from the outset, rather than targeted information systems users who are blind or otherwise disabled as a totally separate market, according to Leedy Day, a former software engineer at Digital Equipment Corp.'s storage prod-

ucts group in Colorado Springs.

For example, Day said IBM sells a separate screen-reader package that gives blind users access to its OS/2 operating system as well as Windows. "But the functionality in that package, which costs \$800 on top of buying OS/2, could have been included in OS/2 itself," Day said.

Had Microsoft implemented universal hooks in its Windows operating environment, it would have cost users 25 cents to 50 cents more per copy, Day estimated.

Day said one of the reasons she left her job at Digital after 10 years was irreconcilable differences over accessibility issues. Another was pure frustration.

Rethinking disability

"Just about every piece of software on the market today has been designed without an awful lot of thought to accessibility," acknowledged Greg Lowney, senior manager and sole staffer of Microsoft's accessibility and disabilities group.

To help change this, Lowney said Microsoft has published and distributed to thousands of independent software vendors guidelines that explain disability issues and how prod-

ucts can work with disability aids.

Moreover, the next version of Windows will include a tool kit feature that allows screen-reading programs to work better with certain graphical information. Farther out, Lowney said greater use of Object Linking and Embedding technology should greatly increase application integration.

But for now, Microsoft has no plans to implement standard access methods across the company's far-reaching product line. Individual business units will continue to develop products as they see fit, Lowney said.

—Julia King

THE INFORMATION SUPERHIGHWAY AND THE BLIND AND VISUALLY IMPAIRED

by

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Over the past decade, people who are blind have enjoyed a new renaissance in terms of information access. This has been chiefly due to the widespread availability of adaptive technology such as synthesized speech, electro-mechanical braille, and screen magnification systems. The online world has also offered much to persons with vision impairments, but developments in the Information Super Highway and the Internet pose grave dangers to the current level of information access for persons who are blind or visually impaired.

THE CURRENT STATE OF THE ART

Personal computers equipped with speech, braille, and magnification adaptive hardware and software have brought a golden age of information access to persons with vision impairments. Talking computers can be used to write, edit, and access electronic documents. Braille devices can be used to either display copy in electro-mechanical form or print hard copy braille from almost any word processing text file. Magnification hardware and software can enlarge text and display it in a comfortable mode for the user. Electronic reading machines can scan printed books and other text into a personal computer, allowing near instant access to information. Computers equipped with adaptive technology and modems can access computer-based bulletin boards, online services, and the vast Internet to send and receive information in an accessible format. For our purposes, we shall use the term accessible to indicate material and electronic equipment that can be utilized independently by persons who are blind or visually impaired.

Currently, blind persons using adapted personal computers can use the Internet for many important functions: electronic mail, file transfers, accessing document archives, etc. Electronic mail is an empowering technology for persons with vision impairments. This is due to the fact that an individual can use a personal computer equipped with adaptive technologies to independently send and receive electronic mail messages. Online archives

of text and computer software can also be accessed by blind persons using these adaptive systems, and an environment has been created that allows near instant access to this information. In the past, blind people used readers to record this information, or transcribers to translate it into braille, a time consuming process to say the least. On average, it can take weeks or months to transcribe a printed book into audio or braille format, a labor intensive and highly skilled process, with these delays often resulting in lost jobs, incomplete school assignments, and more than a little frustration.

THE PROPOSED INTERNET AND POTENTIAL PROBLEMS

The new Information Super Highway may become a barrier to accessible information, if proper procedures are not undertaken immediately. We will attempt to highlight some of the major potential problems in this section.

Graphics based menus and user-interfaces, if not properly adapted, can create an insurmountable barrier for the blind community. Current adaptive technology works chiefly with text-based systems, although there are a few graphics-based access technologies emerging. Each graphical user interface requires its own access technology, forcing blind computer users to use different and complex tools for each graphical user interface.

The storage of data as images, not text, presents another potential barrier for blind computer users. Current adaptive systems rely on ASCII-based text to perform reading functions. Documents stored as graphics images cannot be read by current adaptive hardware and software, and are thus inaccessible to blind users. This could prove to be a very difficult problem for people who are blind as graphics-based documents are expected to be in widespread use in everything from office correspondence to graphical electronic mail systems.

Interactive video systems distributed on the Internet also pose serious problems of access for persons who are blind and visually impaired, unless alternative display methods are enacted. These systems include, but are not limited to, document delivery systems, electronic shopping, online encyclopedias, etc.

Another disturbing trend is that of public information terminals or kiosks. These dedicated computer terminals, connected to the Internet, can pose grave dangers for blind users in their current conceived form. These information terminals are expected to rely heavily on graphics to display information to the user, and will also rely on touch-screen technology, both difficult for persons who are blind or visually impaired to access. These public access terminals, by their widespread nature, could pose a serious threat to information access for blind people, as they will be used for building directories, airline reservations, search and retrieval systems, and are expected to be as commonplace as public telephones.

Access to the printed word has always been a chief stumbling block for persons who are blind or visually impaired, witness the term "print handicapped" often being used to describe the visually impaired. As graphical user interfaces become more common, and spread to document delivery systems, blind people are in danger of losing access to stored electronic

information, which has been relatively accessible up to this point. The blindness community is in danger of losing information access as software manuals, office correspondence, and other printed materials migrate to graphics based systems. Steps must be taken to assure that adaptive technology can access documents created and distributed on the Internet.

Another danger is the merger of the cable television system with the Internet. Companies are beginning to offer information and other services that can be accessed using a standard cable television decoder, with the information displayed on standard television equipment. Unfortunately, this arrangement would prevent blind and visually impaired people from accessing the information, as adaptive technology cannot presently operate in this environment.

The expense of accessing the information superhighway is expected to be significantly higher for persons with disabilities than those without disabilities. The initial cost of the access technology required to turn a standard personal computer into an information retrieval device with either speech, braille, or magnified output can run as high as five to ten thousand dollars, depending on the exact nature of the equipment required. In addition, due to the relative slowness of using these alternative output devices, charging by the hour or by the minute (rather than by the amount of information retrieved or accessed) places the disabled person at a distinct financial disadvantage. Sensible pricing structures to take these important facts into account should be supported.

SOME POSSIBLE SOLUTIONS

We need a series of laws and regulations to establish minimum guidelines, and specific regulations, for information technology so that both the hardware and the user interface software will be accessible to all disabilities. In simple terms, we need an Americans with Disabilities Act (ADA) for technology products and services, where product is defined as any device interfaced to the Information Super Highway. The disabled population need interoperability among user interface options, not just interoperability among applications. an example of this might be a blind person using speech, a deaf/blind person using a braille device, a motor disabled person using a puff switch, while a non-disabled individual employs a touch-screen. this adaptive interoperability is no less do-able than interoperability among applications, but has received little attention. Some other solutions include, but are not limited to, the inclusion of persons who are blind or visually impaired in the creation, testing, and debugging process of new products. Open ended systems should be created that can interface with adaptive hardware and software devices. Where applicable, mainstream devices should have built in access features, or be able to easily interface with adaptive devices. User interfaces must become standardized, and easier to use, and customizable for the individual needs of each end user. Documentation and training materials must be provided in accessible formats. Mainstream and adaptive vendors should work together to create products that are accessible from the design stage to final production.

Access to the superhighway by persons who are blind or visually impaired must be as fast and efficient as that enjoyed by non-disabled users. Overall, success should be measured by useability and accessibility. Successful access is defined as receiving visual information through other means, including (but not limited to) speech output, braille output, or

enlarged output. We encourage our national leaders to champion this cause, as it is a just one. Inaccessible computers and information results in lost jobs, with individuals unable to realize their full potential. We must create a world where information can be accessed by every American, according to their abilities not their limitations.

Access to Technology for People who are Blind or Visually Impaired

-Or-

Why I can't go to an ATM and withdraw funds or set a new microwave oven to cook a potato independently!

Current data from the US Department of Health and Human Services indicate that 1 person in 20 has significantly impaired vision which cannot be further improved with corrective lenses. This figure translates into approximately 12 million Americans with visual impairments.

Access to information and technology is a great leveler for blind and visually impaired people, allowing them to fully participate in our society. Alternatively, lack of such access creates a technology underclass who will be functionally illiterate in the information explosion.

Accordingly, Congress must establish statutory and regulatory requirements which mandate access to telecommunications equipment and network services by individuals with visual disabilities. Market forces and expanding technological capabilities cannot be relied upon to ensure the design and manufacture of products and services which are fully accessible without this mandate.

The equipment and networks which will become the information infrastructure must offer the potential for output/display of information in multiple and synonymous modes including audio, visual, and tactile; along with choice among operating methods including speech, keypads, point and click mechanisms, simplified interfaces and other activation mechanisms usable by people with various disabilities.

Graphical user interface (GUI) technology coupled with an accelerated and pervasive trend for displaying information in a highly visual format has hampered access to data for blind people. Concerns relate to both personal workstations and public access information systems.

Specific concerns for access include, but are not limited to the following: personal computers and computer networks running on GUI access software; touch keys and touch screens on microwave ovens, stovetops, video recorders, small and large electronic appliances; Automatic Teller Machines; service and information kiosks; building directories; and the like.

National guidelines or standards to address information access for blind and visually impaired people are needed. Ultimately, accessibility must become an integral part of all interface designs.

GUIs basically use visual metaphors, for which some blind people lack the

TESTIMONY

presented by

**Paul W. Schroeder
Co-Chair**

**Consortium for Citizens with Disabilities
Task Force on Telecommunication/Communication Accessibility**

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**American Council of the Blind
Association for Education and Rehabilitation
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National Center for Law and Deafness
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RESNA
Telecommunications for the Deaf, Inc.
United Cerebral Palsy Associations
World Institute on Disability**

before

**UNITED STATES Senate
103rd CONGRESS, 2nd SESSION
COMMITTEE ON COMMERCE, SCIENCE
AND TRANSPORTATION**

May 24, 1994

Summary of Testimony

Currently, much of the information required for full participation in our society is inaccessible to millions of people with disabilities. For example, daily newspapers, magazines, government documents, printed paper of all kinds, as well as much of what we see on TV is virtually unusable by people who have difficulty with seeing, hearing, using their hands, learning or a host of other functions. Consequently, these individuals find themselves excluded from opportunities for employment, education, entertainment and much more. Advances in telecommunications equipment, networks and services, along with the production and storage of information as digital text, are dismantling many of these artificial barriers which have prevented Americans with disabilities from enjoying the full rights and privileges of our society.

Yet, the emerging information infrastructure offers a paradox to all Americans, especially the nearly 50 million Americans with disabilities: On one hand, tremendous promise and potential for benefit; on the other hand, further isolation and disenfranchisement. Telecommunications technologies can bring increased independence in access to and use of a tremendous variety of information. However, market forces and expanding technological capability have failed to ensure the design and manufacture of products and services which are fully accessible to and usable by people with disabilities. Information appliances, storage methods and networks are being developed in a way which excludes millions of Americans with disabilities. Furthermore, the extremely high unemployment rate among Americans with disabilities means that affordability is even more critical for this population than for other groups.

To ensure that millions of Americans with disabilities have the capacity to exercise complete and independent control over the information they need to be full participants in society, Congress must pass legislation which directs the entire telecommunications industry to adhere to standards for full access by people with disabilities to telecommunications equipment, networks and services. Likewise, providers of television programming must be directed to provide access to such programs through the use of closed captions and video description. Finally, affordable access by people with disabilities to advanced telecommunications equipment and services must be a priority in the evolving definition of universal service.

Telecommunication policy reform provides Congress the opportunity to ensure that electronic curbcuts are built into the information highway. These curbcuts will provide people with disabilities full, independent and equal access to, and enjoyment of, new information technologies, services and programming. Ultimately, all consumers will benefit from efforts to provide access for consumers with disabilities.

use which confront these individuals. There is a need for Congress to establish statutory and regulatory requirements which mandate that telecommunications equipment and network services be accessible to individuals with disabilities. In addition, Congress must act to end the artificial barriers confronting Americans with disabilities in their enjoyment of and benefit from the plethora of television and video programming which is expanding so rapidly. I will argue that in ensuring that Americans with disabilities are a central focus of the developing information infrastructure, all Americans will benefit from the greater level of choice and user-friendly convenience which will be the result.

Telecommunications Technology and People with Disabilities

Improvements in communications technology and communication networks have dramatically improved opportunities for independence, productivity and integration for people with disabilities. The convergence of telecommunications technology and high speed networks could lead to enormous new opportunities for full and equal participation by citizens with disabilities in employment, commerce, education, health care, entertainment and democratic government. However, significant barriers continue to impede access by individuals with various disabling conditions to many common forms of information, as well as to specific telecommunication technologies. If effective, specific standards are not imposed to govern development of the information superhighway, then access for and use by people with disabilities will be spotty at best and virtually absent at worst.

Historically, telecommunications network and equipment providers have failed to ensure that their products and services are fully accessible to and usable by people with disabilities. Unfortunately, this failure continues today. The examples of inaccessible telecommunications and information technology seem endless.

- It took over one hundred years (with the passage of ADA in 1990) to ensure access to "POTS" (Plain Old Telephone Service) for individuals with significant hearing and speech disabilities, something virtually every other citizen has long taken for granted. As the telephone became more and more ubiquitous, people with significant hearing and speech impairments became more and more isolated.
- Today, the ever expanding use of graphical user interfaces and image-based information storage are taking the power of computers and information networks out of the hands of people who are blind, as well as individuals with certain motor disabilities and those with some learning disabilities. Even the Internet, which had been extremely usable by individuals with various disabling conditions, is increasingly being dominated by an interface called Mosaic which is only partially accessible to many users with disabilities. (Mosaic was developed by the National Center for Supercomputing Applications). (For additional information, see attachment "Assuring Access for the Disabled," from the Chronicle of Higher Education, May 4, 1994.)

- The exploding use of information menus that require voice responses shuts out millions with speech disabilities.
- Users of electronic augmentative communication devices can't get recognition on many existing voice networks.
- Audio text systems which are becoming so common are virtually unusable by people who are deaf.
- Heat or touch sensitive input devices, now commonplace in many information devices, are often virtually unusable (as currently implemented) by individuals with visual or motor disabilities.

These examples, and numerous others which could be cited, are not included here to suggest that the telecommunications industry intentionally discriminates against millions of Americans with disabilities. Nonetheless, developments in telecommunication technologies and services continue to move forward without regard to, and often in ignorance of, the universal access needs of millions of individuals with various disabilities. Government has a duty to ensure that the needs and desires of the users of the national information infrastructure are paramount in the formation of telecommunication policy. Congress cannot, and must not, assume that private industry will voluntarily include the millions of Americans who are disadvantaged by disability or economic status in the emerging information marketplace.

The Need for Access Requirements

For far too long, access to information for individuals with disabilities has depended largely upon the availability of expensive, adaptive equipment. Most of the adaptive equipment--such as telecommunications devices for the deaf (text telephones originally designed for deaf people) or the hardware/software interfaces necessary to allow individuals with visual, speech or motor disabilities to work a personal computer--were developed by small entrepreneurs working feverishly to catch up with developments in the technology they were trying to make accessible. Unfortunately, these access-oriented entrepreneurs have largely worked without assistance from the mainstream corporate developers of telecommunication and other information technology. Consequently, people with disabilities have often been required to spend more than nondisabled individuals for access to hardware and software which quickly becomes obsolete as new developments outstrip the adaptive technology.

Mr. Chairman, this "separate and unequal" (and expensive) system of access to important technology and services for people with disabilities must end. After the passage of the ADA, this is now the logical next step toward bringing an end to disability-based discrimination and isolation.

That is why our Task Force of organizations representing people with disabilities worked so hard to craft requirements to direct the development of access standards as a part of telecommunications policy reform. Fortunately, we found negotiating partners representing the Regional Bell Operating Companies who were also interested in discussing access for people with disabilities to the new information frontier.

The agreed upon language has been included in slightly different forms in both H.R. 3626 and H.R. 3636. Taken together, both legislative proposals would require that "telecommunications equipment and customer premises equipment designed, developed, and fabricated" by a Bell Operating Company manufacturing affiliate (H.R. 3626), and "advances in network services deployed by Bell Operating Companies" (H.R. 3626) or "local exchange carriers" (H.R. 3636) "shall be accessible and usable by individuals with disabilities, ... unless the costs of making the equipment accessible and usable would result in an undue burden or an adverse competitive impact." In addition, the language states that whenever an undue burden or adverse competitive impact would result from these requirements the covered entity which manufactures the telecommunications equipment or provides the network service shall ensure that the equipment or service is compatible with existing peripheral devices or adaptive equipment commonly used by persons with disabilities, unless doing so would result in an undue burden or adverse competitive impact. H.R. 3636 also includes a provision which would require the FCC to review the standards and requirements at least once every 3 years through a proceeding to find out whether these regulations have ensured that advances in network services are accessible and usable by individuals with disabilities. That legislation also includes a direction to the FCC to commence an inquiry "to assess the impact of deployment of digital technologies on individuals with disabilities, with particular emphasis on any regulatory, policy, or design barriers which would limit functionally equivalent access by such individuals."

The language does not impose a legislative solution, rather it clearly favors negotiation under the auspices of the FCC between industry and people with disabilities in order to arrive at a solution. The language also incorporates flexibility to ensure that solutions can evolve over time to meet the rapid advances in telecommunication technological development. We note that this language was a compromise which establishes the principle of full access along with the inclusion of exemptions for circumstances where access cannot be provided because of an undue burden or adverse competitive impact. The disability community is concerned about the language which provides for exemptions from access requirements where an "adverse competitive impact" would result. However, we believe that the ultimate requirements worked out with industry and the FCC will narrowly interpret that clause to ensure that a mere effect on profit would not be sufficient in itself to trigger the exemption. For example, the final standard would likely indicate that the number of consumers or consumer products potentially benefiting from the development and implementation of an accessible design innovation may be a relevant consideration in determining whether the activity in question imposes an undue burden or adverse competitive impact.

The disability community believes that S. 1822 offers the best opportunity to extend the access requirements currently contained in H.R. 3626 and H.R. 3636 to all players in the huge and growing telecommunication industry. We note that the newly proposed Sec. 229 in S. 1822 already includes the framework around which a broader disability access requirement could be built

[(d)(4) DISABILITY ACCESS.—The Commission and the States shall ensure that advances in network capabilities and telecommunications service deployed by telecommunications carriers are designed to be accessible to individuals with disabilities)..

It is in the public interest to ensure that all sectors of the telecommunications industry address the access needs of individuals with disabilities when developing, designing or fabricating telecommunications equipment, networks or services. We believe that the FCC should be responsible for setting the standards rather than allowing access provisions to be fragmented between the FCC and the states. In short, if the Regional Bell Operating Companies can agree to manufacture telecommunications equipment and design network services to be accessible to people with disabilities, there is no compelling reason why all other players in the industry cannot meet this reasonable goal.

A Step Toward Universal Design

These requirements are an important first step toward a concept of universal design. (The goal of universal design is to build or design a piece of equipment or a network which is equally accessible to and usable by the vast majority of individuals including people with disabilities). Toward this end, it is critical that telecommunication networks and equipment be not only interoperable but also fully accessible to and usable by Americans with Disabilities. The equipment and networks which will become the information infrastructure must offer the potential for output/display of information in multiple and synonymous modes including audio, visual, and tactile, along with choice among operating methods including speech, keypads, point and click mechanisms, simplified interfaces and other activation mechanisms usable by individuals with various disabilities. The solutions for access--if designed into the new appliance, network or service--are low cost, mostly no cost, straightforward and beneficial to people without disabilities as well as to people with disabilities. (For additional information see attachment "Use of Multiple Parallel Interface Strategies to Create a Seamless Accessible Interface for Next-Generation Information Systems.)

* Because access to the information highway will increasingly depend upon multifunctional information appliances, it is important to ensure that providers regulated under Title VI of the Communications Act, (and Title VII, if the Congress adopts the Administration's proposal), should be required to meet the access needs of individuals with disabilities. For example, many current Cable-TV boxes are not fully usable by, or accessible to, individuals with disabilities. This situation is only likely to worsen. The future hybrid information

appliances, such as the so called "set-top box," may or may not be covered under Title II of the Communications Act. Expanding the coverage of the access requirements to all relevant industries and providers would enhance equality for people with disabilities and establish parity within the telecommunications industry with respect to ensuring access.

Access Requirements Have Worked

The Television Decoder Circuitry Act provides the best legislative example of how well access requirements can work. The Electronics Industry Association (EIA) expressed many concerns about the Television Decoder Circuitry Act that are similar to concerns which are likely going to be raised about these access requirements. For example, EIA raised concerns about the costs of manufacturing the decoder chip, its technical feasibility, and time frames for its implementation. However, the EIA and television manufacturers learned that the costs, technical solutions, and implementation dates were manageable. In addition, they learned the television sets would be functional for the hearing impaired, learning disabled, and people for whom English is a second language. After the Decoder Act went into effect, EIA launched an advertising campaign, called CAPTION VISION, to promote the sales of television sets with built-in decoder circuitry. One television manufacturer, the Zenith Electronics Corporation, conducted an aggressive selling campaign of these decoder sets, focusing on the hospitality industry, resulting in a banner sales year for Zenith. One manufacture tied the closed caption feature to the mute control.

We cannot afford to forget, Mr. Chairman, that the industry, at the time, saw that proposal as onerous and bad for business. It is likely that some businesses in the telecommunications industry will complain that the requirements for full access by people with disabilities to telecommunications equipment and networks will be onerous and bad for business.

The manufacture of hearing aid compatible telephones provides another example illustrating that accessibility provisions are essential, not burdensome and that industry can adapt to meet them. Prior to the early 1980s, most telephones were voluntarily hearing aid compatible. Unfortunately, after deregulation, with no standards to mandate hearing aid compatible telephone equipment, non-compatible telephones began to appear virtually everywhere. The Hearing Aid Compatibility Act of 1988 required that all telephones manufactured in the U.S. or imported for use within the U.S. after August 16, 1989 be hearing aid compatible. Although some provisions of the law have not yet been implemented satisfactorily, the manufacture and sale of hearing aid compatible telephones is providing access for individuals with hearing aids and improved telephone access to all Americans.

Closed Captioning and Video Description

Americans with disabilities, particularly those with hearing impairments and vision impairments, believe that the time is right to ensure that video programming is fully accessible. For too long, individuals with hearing and visual disabilities have been unable

Assuring Access for the Disabled

Growing use of graphical devices in computing is cutting some people off

By David L. Wilson

OFFICIALS at the National Science Foundation thought they were being helpful when they installed easy-to-use computer software that enables their employees to use the Internet by pointing and clicking with a mouse on icons and buttons on a screen.

An employee can browse through the latest list of NSF grant recipients, for example, by calling up a map of the United States. Click on an image of North Carolina, and a list of projects in that state appears. Click on a specific grant at North Carolina State University, and up comes a document stored on a computer at the institution.

The changes were helpful to many employees. But they made it impossible for Larry Scadden, an accomplished Internet user and senior program director of the NSF's program for people with disabilities, to use the office's computers.

HELPLESS SOFTWARE, HELPLESS USER

Mr. Scadden is blind. Until last month, he used a computer equipped with software that can speak words aloud as they appear on his computer screen. That software, however, is helpless when it comes to things like buttons on the screen; it does not recognize them. Mr. Scadden has been effectively cut off from the Internet.

"They took it away, and I'm the one who used Internet all the time," says Mr. Scadden, who adds that technicians are trying to solve the problem. "Now I have to go home to do some of my work."

Mr. Scadden's predicament frightens a large number of blind professors and students who have embraced the computer and the Internet as a means of freeing themselves from dependence on others. They have been able to read newspapers, produce journal articles, and even shop on line without assistance.



Norman R. Coombs of the Rochester Institute of Technology:
"A lot of blind people have gotten near-hysterical about this."

JOSEPH BING FOR THE CHRONICLE

The broad movement toward graphical applications using buttons that cannot now be read aloud or translated into Braille has sparked widespread concern among the blind. Many people are working on solutions to the problem, and experts say there are ways around it.

OMINOUS PITFALLS

But even if blind users can get past icons and buttons to open up a computer program, they may face a much more ominous difficulty once they get in. As the power and speed of computers and networks increase, more and more information is being displayed using images and graphs, such as pie charts, instead of lists of numbers. Sighted people find such images more useful than the raw data they represent, but researchers say they have no clear idea of how to enable the blind to interpret information presented in that form.

With the development of the National Information Infrastructure, the data highway proposed by the Clinton Administra-

tion, computers will play an inescapable role in everyday life and be used for everything from registering voters to ordering pizza. The blind are afraid they will be cut off from computers that present information in ways they cannot interpret.

When the Apple Macintosh was introduced a decade ago, it used a "graphical user interface," or GUI (pronounced *gooey*), and was praised by many who said pointing and clicking at icons was the future of computing. Blind people, however, could not use the Macintosh, because no screen-reader software was available. They ignored the new computer and stuck with those based on a design by the International Business Machines Corporation. On those, users could type letters on a screen to get to a specific file, and the computer would respond with letters on the screen as well, which the screen-reader software would recite aloud.

Eventually, software designers developed programs that could verbalize the layout of a Macintosh screen. Such programs recently became available for GUI's

built for computers based on the IBM design as well. Today, the most common GUI is called Windows, and until very recently, the blind were hoping they could ignore that as well, since even the best screen-reader software tends to break down and leave a user stranded.

DOMINANCE OF WINDOWS

Over the last three years, however, Windows has come to be the dominant force driving the computer market, as have the IBM-type computers on which it runs. Windows essentially makes an IBM computer run like a Macintosh. Today it is hard to find new software on the market based on the old "command line interface" that the blind had come to depend on.

Even computers that run UNIX, the operating system used by powerful workstations that are used by scientists and are the workhorses of the Internet, are now frequently operated by pointing and clicking. The GUI has come to dominate the market because software based on such a system

Continued on Page A28

August 11, 1994

Dear Ed:

I am including a document that our company supplies to vendors that want their windows products to be speech friendly. If vendors followed the attached guidelines, then windows access would be much easier than it currently is. However, this is not the case. Microsoft, the developer of windows, and the developer of the standard I/O interface we seek to follow, is one of the biggest offenders. While we do work with their contact person to point out problems in an attempt to solve them, he is not supported in a meaningful way so progress is slow.

I do not want to leave the impression that microsoft is the only vendor that is at fault. I doubt that many vendors realize what techniques are speech friendly and what techniques are barriers to quality access. I hope that the attached document will help you explain to others what we need from vendors in order to efficiently access their programs.

Should you have additional questions, please do not hesitate to contact me.

Sincerely,

Randy L. Knapp
Speech Products Manager
Artic Technologies, Inc.

Guidelines for making a speech friendly application

Basic rule of Thumb:

Let windows handle the user interface for you, Don't make up your own custom interface functions.

Text:

DO:

To put text on the screen use standard Window's functions such as TextOut and ExtTextOut.

DO NOT:

Don't use text stored in a bitmap or your own font drawing code. Buttons that that are all bitmap such as the borland buttons are an example of bitmap text.

Text that is first written to a bitmap and then the bitmap is placed on the screen is sort of OK, except if you cache the bitmap and use it much later in the program.

Dialog boxes:

Do:

Use the dialog functions provided by the Windows such as: CreateDialog, CreateDialogIndirect, CheckDlgButton, SetDlgItemText, CheckRadioButton, etc..

Make all the parts of your dialog keyboard accessible. The tab key should move around the groups in your dialog and the arrow keys should move around the items in a group.

DO NOT:

Don't make your own custom dialogs that don't use any of the API dialog functions.

Don't use buttons that are all bitmap. This includes buttons that

only have pictures on them and buttons with bitmapped text.

Don't make buttons or other dialog items which can only be accessed by the mouse.

Menus:

DO:

Use the window's menuing system.

DO NOT:

Don't make your own menu system.

Bitmaps/Icons:

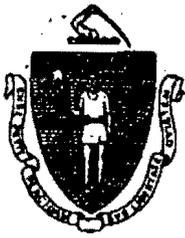
The use of bitmaps and icons are fine, however we feel that functions should not only be accessible through icons. For example if the user can access spell check by pressing a button on a speed bar then they should be able to do the same using the menus or an accelerator key.

DO NOT:

Don't layer icons on top of icons, this can confuse the access software.

Don't use bitmaps to display text!

Don't make graphical representations of values without text accompanying them. For example don't make a speedometer gauge to show how far something has progressed without putting a percent value below it. An example of graphics that is paired well with text is the status bars most applications have in their installs. The bar goes up showing how far the install has progressed, but there is also text in the middle of the bar showing a percent value.



The Commonwealth of Massachusetts

Executive Office of Health and Human Services

Commission for the Blind

88 Kingston Street, Boston, MA 02111-2227

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CHARLES H. CRAWFORD
COMMISSIONER

To: Charles H. Crawford

From: Joseph J. Lazzaro

Date: August 18, 1994

Re: The Windows Problem

I am writing this memorandum to describe the current difficulties with the Microsoft Windows operating system and how it relates to blind and visually impaired computer users. In summary, Windows and Windows-based application programs do not work reliably with speech output programs utilized by blind users. In a nutshell, Windows-based screen reading software cannot reliably obtain vital information from the operating system. This results in unfaithful cursor tracking, mouse tracking, tab tracking, with the net effect of users being unable to operate Windows software independently.

As project director for the Adaptive Technology Program at the Commission, I am greatly disturbed by this fact. Because Windows is an unreliable operating environment for blind computer users, jobs are being lost by blind persons, and more and more companies continue to migrate into the Windows sphere of influence. I fear that blind persons may be locked out of future job mobility as their companies upgrade to Windows, and that computers in general may become unusable by the blind altogether. This would indeed be a great tragedy because personal computers have over the past decade allowed the blind nearly unlimited access to information through the technologies of speech output, braille output, and screen magnification. The accessibility that has been so difficult to obtain is now in great danger of being taken away forever, unless Microsoft rectifies the current sad state of affairs.

In a very few words, much of the current difficulties with Windows applications could be rectified if software packages were truly standardized. Also, Hooks need to be imbedded in the Windows operating system to enable and assist speech, braille, and screen magnification systems. Hooks are currently being added to the X-Windows system running under Unix. This is expected to create a much more user friendly environment for the blind under that operating system.

Because of its vast resources, and technical skill, Microsoft could (with the assistance of the disabled technical community) easily rectify this problem, and create an environment where the blind can flourish. Recently, Microsoft mailed all its developers a memorandum stating that they would be denied the "Windows" trademark unless they supported the new object-linking standards within Windows 4.0. I urge Microsoft to work with the disability community to adopt a series of standard programming practices for creating accessible Windows applications, and to urge its developers to comply with these standards. An inexpensive method might be to utilize beta-testers with disabilities to test applications with adaptive equipment before they enter the market. This would assure that new applications worked with adaptive devices for the blind. I do not believe it makes sense to install Hooks in the current Windows 3.1 product, but to focus on the upcoming release of Chicago.

I am including with this memo a copy of an article that appeared in the May 1994 issue of Byte magazine. The article discusses the current state of affairs of Windows access products for the blind and visually impaired. Although the article may seem like all the problems are solved, current Windows screen readers do not read the screen consistantly, effectively locking the Blind out of the inevitable and unavoidable Windows problem.

In summary, Blind persons cannot use Windows because the screen cannot be read consistantly.

Text of article...

ADAPTING GUI SOFTWARE FOR THE BLIND IS NO EASY TASK

BY

JOSEPH J. LAZZARO

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The use of GUIs among blind computer users is increasing, for better or worse. According to the Royal National Institute for the Blind (London, U.K.), 82 percent of the software firms surveyed in Europe and the U.S. see the use of GUIs increasing among blind users. "The blind are being guided down a graphical path as text-based applications become scarcer and scarcer," says Dave Kostyshyn, president of Syntha-Voice (Stoney Creek, Ontario, Canada), developer of the first speech program for Windows for blind users.

This widespread adoption of graphical applications adds a whole new set of challenges for applications developers and visually impaired users. The World Institute on Disability (Oakland, CA)

estimates that between 400,000 and 500,000 people in the U.S. cannot see well enough to use a monitor without depending on speech synthesis or some other alternative output, such as braille.

GUI platforms rely on spatial and pictorial representations to convey information, which makes them much more difficult to use for many blind users than text-only applications, according to Kostyshyn. To make a GUI-based word processor or other type of program accessible to a blind user, developers of speech-synthesis programs must verbalize information about the interface (including buttons, menus, and text associated with graphical objects) and the application itself (including cursor position, font style and color, dialog boxes, and graphical images).

Luckily for companies that need to comply with the Americans with Disabilities Act, more GUIs are being adapted for the blind with speech, braille, and magnification systems. Although not always easy to use with all applications, this new generation of graphics-based adaptive hardware and software lets the visually impaired use Mac, OS/2, Windows, and other GUI platforms. At the 1993 Closing the Gap conference, which is often described as "the Comdex of the adaptive-computing industry," many new assistive devices were introduced.

The Mac was the first GUI-based platform to become accessible for the blind, thanks to Berkeley Systems' Outspoken speech software. (For information on other adaptive products, see "Computers for the Disabled," June 1993 BYTE.) Due to the overall success of Windows 3.1, users can pick from a wide variety of Windows-based adaptive hardware and software products. The newest Windows speech package to enter the market, WinVision from Artic Technologies (Troy, MI, (313) 588-7370) joins Windows screen readers like Window Bridge from Syntha-Voice ((905) 662-0565) and ProTalk from Biolink Computer Research and Development (North Vancouver, British Columbia, Canada, (604) 984-4099). IBM has developed Screen Reader/2, a speech-access program for OS/2 that lets the blind use DOS, OS/2, and Windows applications with the aid of speech and braille output.

A previously inaccessible platform for the disabled, Unix and its GUIs, is starting to attract developers. Several are working on a suite of adaptive products for Unix, ranging from speech programs for the blind to keyboard-enhancement utilities for persons with motor disabilities. The Disability Access Committee for X, or DACX, is creating operating-system-level hooks to make it easier to develop speech- and braille-access systems for visually impaired users.

"We want to make the workstation environment friendly to adaptive developers by creating device-independent tools," says Earl Johnson, manager of enabling technologies at Sun Microsystems Laboratories (Mountain View, CA). According to Johnson, DACX is creating solutions that will let developers target several different Unix platforms when they develop for one platform.

In addition, the Commission of the European Communities has funded GUIB (Graphical User Interfaces for Blind People), which is exploring the following output technologies: speech, braille, and audio. Those involved in the GUIB project are working to ensure that new platforms are developed with the needs of disabled people in mind.

Although GUI-based platforms are becoming more accessible, Syntha-Voice's Kostyshyn notes that the next wave of operating systems will offer a new set of challenges. For example, when Microsoft unveils its new version of Windows with its overhauled interface, speech-reader programs will have to be modified as well.

The process of adapting GUI platforms will be further complicated by the expected increase in the number of 3-D applications. Ronald Morford, a blind programmer and president of Automated Functions (Arlington, VA), says, "The translation of 3-D graphics screens into braille or speech output is a formidable task for the programmer and a sometimes steep learning curve for the blind user." Challenges like these add a whole new set of dimensions for developers of adaptive products.

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August 19, 1994

Microsoft Corporation

To whom it may concern:

For most computer users, accessibility is the deciding factor in purchasing a particular operating system, computer, or software package. You want your investment to cover as wide a range of computing situations as possible.

When I plan computer purchases, I look for accessibility. The current lack of screen-reader accessibility in Windows is depressing. I am not visually impaired, but if I were, I would want to be able to use the same computing tools available to the rest of my colleagues!

MS-DOS opened a whole world of computing for people. And now Microsoft has the opportunity to be the industry-leader in accessible computing by working with developers, and keeping in touch with the needs of its customers.

Thank you for your consideration.

Sincerely,



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