Information Technology and Americans with Disabilities:
An Overview of Innovation, Laws, Progress and Challenges

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Foreword

The National Council on Disability is an independent federal agency with 15 members appointed

by the President of the United States and confirmed by the U.S. Senate. The overall purpose of

NCD is to promote policies, programs, practices, and procedures that guarantee equal

opportunity for all individuals with disabilities regardless of the nature or significance of the

disability and to empower individuals with disabilities to achieve economic self-sufficiency,

independent living, and inclusion and integration into all aspects of society. This topic paper is

part of a series of topic papers designed to provide brief background information on United

States disability policy for use by the delegates in their deliberations on the United Nations Ad

Hoc Committee on a Comprehensive and Integral International Convention on the Protection and

Promotion of the Rights and Dignity of Persons with Disabilities.

Executive Summary

In the NCD 2001 report to the President and Congress, *The Accessible Future*, the impassioned and prescient concluding statement is:

> The convergence of technology, attitudes, demographics and law has created unprecedented opportunities for eliminating one of the most significant sources of inequality in our society… .[T]he value and wisdom of making E&IT [electronic and information technology] accessible for all can hardly be disputed. People of good will are working in partnership and committed to overcoming the obstacles that can bring about advances which will dramatically improve the future for all of us. The moment and the means are at hand.[i]

This paper on information technology continues the optimism of the 2001 report and articulates developments, partnerships and initiatives that have been put into place since then by government, the private sector, academia and non-profit organizations. The central point of the paper is that the U.S. experience has evolved through a dynamic process of invention and innovation, legislation, adaptation and advocacy. The main actors in this still evolving process have been and continue to be: industry or the private sector, government, and the disability advocacy community. It is not the intent to argue that the approaches adopted in the United States are the best or only way of ensuring access for people with disabilities, but instead to provide this information as a resource to those engaged in ultimately implementing the new convention. Although it is beyond the scope of this paper to provide an in-depth assessment of the impact of the legislation, programs, policies, and practices described here, documents providing such assessments are available and referenced in the footnotes for those interested in learning more.

Many inventions of information technology for people with disabilities subsequently proved useful to other sectors of society and popular with the general public (e.g., scanners, talking books, captioning), suggesting that there is a case to be made for socio-economic

investment in accessible information technology. This pattern of specialized products, later proving of value to the overall population, is supportive of the worldwide move towards the practice of universal design.

The four sections of this paper are:

- Chapter 1: Introduction, context of the right to information in the U.S., statistical portrait of American use of assistive technology, and definition of terms;

- Chapter 2: Tangible benefits to society of investment in assistive technology;

- Chapter 3: U.S. legislative milestones in making information technology more accessible; and

- Chapter 4: Case studies of support for accessible information technology from the governmental, academic, private and non-governmental or civil society sectors.

I. Introduction, Right to Information, and Definition of Terms

Americans have long been accustomed to having broad, deep and almost unlimited access to information.

The national bent toward freedom of information can perhaps be traced back to the beginning of the battle for independence. Thomas Paine's famous pamphlet, *Common Sense*, was self-published in 1775, and was the first widely disseminated call for support of the colonies.

Some "infostructure" researchers believe that in the U.S., "Information began to be considered an asset a century ago when Andrew Carnegie started financing public libraries." [ii] More than 1600 Carnegie libraries, the foundation of the free public library system, were funded during the period 1886–1917 by the Scottish philanthropist who believed that, like himself, other immigrants needed to acquire cultural knowledge about America free of charge.

Legislative Milestones of the Public Right to Information

Historically, a "pro-public" information milieu in the U.S. has brought about legislation and regulations that incrementally have expanded citizen access decade by decade. Examples of landmark legislation include creation of the Library of Congress in 1800 as the national library of the U.S., with its responsibility to serve blind and print readers with disabilities established by an Act of Congress in 1931; the Freedom of Information Act of 1966, the first law to establish an effective legal right of access to governmental information, underscoring the crucial need in a democracy for open access to governmental information by citizens; and the 1996 amendment of this law called the Electronic Freedom of Information Act Amendments of 1996. Additionally, the creation of presidential libraries has resulted in a quickened transfer of massive collections of documents about government into the public domain.

Changes Introduced by the Internet and the World Wide Web

Until recently, most information could be accessed actively through visiting our vast, free public library system or accessed more passively, through the extensive mass media, which acts as both a mirror of society and a window on a wider world.

While the Internet has been in existence for decades, it was the birth of the World Wide Web in 1990 that has made possible the instantaneous availability of information, almost beyond the limits of the imagination, resulting in an unparalleled universe of data, news, research and opinion. The Web has moved us towards a global information system with instantaneous and publicly available access that has transformed the availability of all types of information.

The resulting challenges in providing equal access to information to citizens with disabilities have been both eased by developments in information technology and made more complex, as was pointed out in the NCD report, *The Accessible Future*, summarized below.

The Accessible Future?

As stated in the Letter of Transmittal to President Bush in the 2001 landmark report of

the National Council on Disability, *The Accessible Future*:

> The rapid advances in our nation's electronic information and technological
> capability are inspiring. In this successor era to the Industrial Age, information is
> more and more the principal commodity of commerce, and technology, ranging
> from the computer to the information kiosk, from the electronic message board to
> the DSL line, is more and more the medium for transmission, storage, and
> manipulation of that information. Access to information technology is
> increasingly the arbiter of success and the source of opportunity in education and
> employment.[iii]

The report further notes:

> For America's 54 million people with disabilities, however, access to such
> information and technology developments is a double-edged sword that can
> release opportunities or sever essential connections. On the one hand, such
> developments can be revolutionary in their ability to empower people with seeing,
> hearing, manual, or cognitive impairments through alternative means of input to
> and interaction with the worldwide web, information transaction machines, and
> kiosks. On the other hand, electronic information and technological developments
> can present serious and sometimes insurmountable obstacles when, for example,
> basic principles of accessibility or universal design are not practiced in their
> deployment.[iv]

A Nation Online

In 2002 the U.S. Department of Commerce released a report entitled, *A Nation Online*,

showing that people with disabilities tended to use the Internet for the same things other people

use it for: e-mail, instant messaging, searching for information and shopping.[v] The report also

found that Internet use by people with disabilities was increasing rapidly—for example, about

the same proportion of individuals with and without disabilities have broadband connections.[vi]

As of August 2004, some 63 million Americans had broadband, according to the

Nielsen/NetRatings.[vii] According to Frank Bowe, a technology researcher and disability

advocate, of people with disabilities who use the Internet, about 84 percent have dial-up connections, 11 percent have access through cable/modem and 5 percent have broadband.[viii]

The May-June 2001 Harris/National Organization on Disability Survey contacted 2024 people by phone and found that 38 percent of adults with disabilities used the Internet at home, compared with 54 percent of adults without disabilities.[ix] Among the population with disabilities that was surveyed, the strongest Internet use was among people with vision or hearing impairments (43 percent), followed by people with a learning disability or mental retardation (39 percent) and by those with mobility limitations (35 percent).[x]

Over the previous five years, Internet use by people with disabilities had increased five-fold while the use by non-disabled persons had doubled. [xi]

Increasing Future Need for Accessible Technology

In 2003 Microsoft Corporation commissioned a report on "The wide range of abilities and its impact on computer technology," and its findings point to an increasing demand for accessible technology to enable customization of computers according to an individual's disability. [xii]

In the United States 60 percent (101.4 million) of working-age adults from 18–64 years old are likely or very likely to benefit from the use of accessible technology due to disability that may impact computer use.[xiii] Among current U.S. computer users who range from 18–64 years of age, 57 percent or 74.2 million are likely or very likely to benefit from use of accessible technology due to disability that may impact computer use.[xiv]

As the U.S. population ages, this report notes that these trends will more than likely accelerate and that future computer users can be expected to demand and expect greater accessibility.[xv]

The report concludes that:

> The findings in this study indicate that technology currently aimed at people with severe difficulties and impairments can also improve the computing experience for the vast majority of computer users. A large and growing potential market for accessible technology exists to serve individuals who have some degree of difficulty or impairment that impacts their ability to use a computer. Further innovation should be done to make technology even more accessible. Accessible technology has the potential to powerfully extend, expand and enhance user experience and productivity. Addressing the needs of those who are likely or very likely to benefit from the use of accessible technology requires an industry-wide effort.[xvi]

Definitions of Terms

There are various definitions of terms under the umbrella term "information technology,"

(IT) but the explanatory overview presented by NCD in its *The Accessible Future* report is:

"IT is known by various names in its application to the lives of people with disabilities.

Such terms as 'adaptive equipment,' 'assistive technology,' and 'electronic and information

technology' all have their place as subsets or extensions of what we commonly think of as IT,"[xvii]

a term that generally corresponds with the term, "Information and Communications

Technology," (ICT), generally used in Europe.

> "Adaptive equipment," a general term with no specific statutory definition, describes any sort of modification to technology, including design changes or add-ons that make it more accessible or usable by people with disabilities. AT, a statutory term deriving from the Technology-Related Assistance for Individuals with Act of 1988, includes both AT devices and services. An AT device is any item or system "that is used to increase, maintain and improve functional capabilities of individuals with disabilities." E&IT as defined in the implementing regulations for Section 508 of the Rehabilitation Act is specific to the communications and information environment and refers to the broad range of hardware, software and other components making up the environment.[xviii]

In its implementing regulations of Section 508, the U.S. Access Board further explicates

E&IT:

> [E&IT] includes information technology and any equipment or interconnected system or subsystem of equipment, that is used in the creation, conversion, or

duplication of data or information. The term electronic and information technology includes, but is not limited to, telecommunications products (such as telephones), information kiosks and transaction machines, World Wide Web sites, multimedia and office equipment such as copiers and fax machines.[xix]

II. Tangible Benefits to Society of Investment in Assistive and Information Technology

This chapter provides insights and examples suggesting that we in the disability field rarely make a sufficiently strong socio-economic case for the demonstrable societal payoffs of investment in assistive or information technology designed to benefit children and adults with disabilities.

It may prove useful to advocates from other countries to use these examples of how investment in assistive technology for persons with disabilities has paid off for society at large. If the examples provided below are considered aggregately, it is clear that financial investment in assistive technology reaps great rewards in terms of direct benefit to all.

Captioning of Films and Television programs

As a case in point, captioning for television and film, conceived of as an accommodation for Americans who are hard of hearing and deaf, has now become accepted as an important tool for teaching English language learners. Substantial research continues, but findings so far clearly underscore that to read and hear language at the same time is of significant, even unique, benefit to those learning another language or upgrading language skills. [xx]

The burgeoning industry to teach English to non-native speakers in the U.S., serving primarily a huge immigrant population through both public and private services, has been quick to ascertain the value of this tool. [xxi] It is somewhat ironic that this unique tool was slowly developed with scant research funds, in response to persistent advocacy by the deaf community for decades because it was perceived by funders as more or less a charitable service for a small

segment of the population. How much more quickly would captioning have been researched and become routine if it had been framed as an educational support for a much wider segment of society?

Additionally, the use of program captioning has spread all over the world to augment or substitute for audio information in noisy places such as airports and train stations, to underscore breaking news and emergency information feeds and broadcasts, and through the huge new market for feature films on DVDs, which generally feature captions or subtitles in the language of origin and two or three other languages. It is becoming clear that in many countries, people who are deaf are now only a minority of the population regularly utilizing captioned news and other educational or entertainment programming.

Making the Case to Governments and the Private Sector

It is undeniable that many of these societal payoffs were unforeseen, or as researchers say, born of "unanticipated consequences." Yet, the examples are so numerous that overall there is a clear track record of long range recouping of investments and accumulation of profits in improving information technology for people with disabilities.

Internationally and regionally, disability advocates who want to influence policy-makers, governments, and the private sector to invest in research, development and deployment of information technology to support equal access to and benefit by people with disabilities could:

- become more familiar with some of the examples provided here;

- undertake research to identify other examples;

- support cost-benefit research of these and other examples;

- collaborate to produce persuasive evidence-based reports on how investors can reasonably expect their support to manifest greater returns to society; and

- initiate public education campaigns to create greater awareness of the societal benefits of this type of investment.

Other Clear Cut Examples

Ramping Up

Throughout the world, from Hanoi to Houston, we have become accustomed to using curb cuts or ramps to move around more easily when using scooters, walkers, bicycles or skateboards, when pushing strollers or carts, or dragging suitcases or equipment on wheels. It is hard to remember that only a few decades ago, the idea of providing curb cuts and ramps in public spaces was perceived by governments as an extremely expensive and bothersome accommodation for a tiny sector of the population—those who use wheelchairs for mobility.

Similarly in the realm of information technology—the analogy is the electronic curb cut—we are now witnessing the huge societal payoffs of investments in information technology and can surely expect to see many more.

Infant sign language

American sign language and British sign language were originally developed for a "narrow band" usage by deaf persons and their educators, and which are now being explored for broader applications. Parents of infants in the U.S. and U.K. are discovering that by teaching basic or simple signs to their young children, they can communicate with them up to a year before the natural development of speech. There is already a flourishing industry of courses and educational videos to train parents in how to converse in simple sign language with their children as early as six to eight months old, and researchers are following developments closely. [xxii]

<u>Products Designed for Readers and Writers who are Blind</u>

Investments in information technology designed for people who are blind have also paid off handsomely for society at large. The typewriter, long playing records, the scanner and audio-books were all researched, designed, and developed for what their inventors must have assumed was a very small segment of the population. In each and every case, generic applications for these products far eclipsed their original purposes, entire new markets were created for each product, and eventually exceeded their use by readers and writers who are blind.

Large markets, and in some cases still growing markets, evolved for each of these products intended for children and adults who are blind. As the markets for these products grew, further investments were made to improve and update the technology, which becomes increasingly cost-effective when spread over a large user population. Audio books, as just one example, according to a recent article in the International Herald Tribune, "Talking literature, with sales last year of $900 million, is one of the bright spots in a book industry whose overall 2004 sales grew modestly last year." [xxiii]

<u>Technology Transfer Humor</u>

An example of information technology making the leap from narrow to generic application was given by Dinah Cohen of the Department of Defense Computer/Electronic Accommodations Program at a 2004 White House/Veterans Affairs Conference on Emerging Technologies.

> One of the humorous ways we have seen technology transfer is when they started to use voice output for people who are blind and low vision. And they were thinking, "This is great because it reads what's on the computer. You can hear what's on the computer screen."
> All of a sudden, it got a little modified. It wasn't a male voice. It became a woman's voice. And it ended up in our navigation systems in the fancy cars to help all of you men who refuse to stop and get directions.[xxiv]

Great Expectations

From this wide variety of examples, it appears that:

1) investment in assistive technology, especially information technology, for people with disabilities is likely to benefit society at large as well as improve the quality of life and the productivity of people with disabilities;

2) the earlier that accessibility and greater universality of use are built into the planning process, the lower the ultimate cost of information technology;

3) in countries where the population is aging, the investment in "disability friendly" information technology can be predicted to have an even higher level of spillover into generic use; and

4) there is encouraging evidence in the U.S. and in other countries that new "disability savvy" partnerships between the public and private sectors are growing beyond the occasional island of excellence and demonstrating the societal value of universal design in information technology, just as it has proved itself in the areas of buildings and transportation.

We are now maturing beyond the stage of prototypes and pilot projects to acceptance of the need for joint investment of expertise and resources to retool our services and systems to benefit all of society. Surely, it would strengthen our case if it were more widely known how beneficial previous investments in assistive technology have proven.

Of course, no one can predict with certainty what long-range impact each and every investment in assistive information technology will have on the lives of disabled persons or on society as a whole. But, if we consider the magnitude of societal impact of these examples of

historic and contemporary devices designed for people with disabilities, it is not unreasonable to harbor great expectations.

III. U.S. Legislative Framework for Advances in Accessible Information Technology

This chapter outlines the scope of major U.S. laws advancing accessible information technology. The information that follows has been condensed from previous NCD publications and websites of the responsible agencies.

The legal framework of information technology access rights for Americans with disabilities is centered on three federal statutes having the greatest impact: the 1990 Americans with Disabilities Act (ADA), Section 255 of the Federal Communications Act of 1996, and Section 508 of the Rehabilitation Act as amended in 1998.

(Complete descriptions of these laws and their impact can be found in many authoritative texts; the information provided here will be vastly abbreviated, aimed at illuminating the information technology aspects.)

Americans with Disabilities Act

www.adaportal.org

ADA: This Act has four titles covering various types of discrimination. Title I bans discrimination in employment; Title II covers provision of services by state and local government; Title III focuses on provision of or access to goods, services and facilities of public accommodation and commercial facilities; and Title IV requires provision of telephone relay services.

Title I requires employers to make reasonable accommodation if it does not involve "undue hardship" or fundamentally change the nature of the employer's business. Therefore, if

an appropriate technological solution for a qualified individual with a disability exists, the employer would ordinarily be required to implement this solution.

The Equal Opportunity Commission is primarily responsible for implementing Title I.

Title II entails various obligations of state and local governmental agencies, including ensuring "effective communications" with members of the public seeking relevant information or services from them. Examples of means for delivering these services include providing auxiliary aids and services such as qualified interpreters, assistive listening devices, open and closed captioning, qualified readers, brailled materials, etc.

Title III requires private entities and commercial facilities meeting the definition of "public accommodations" to make their goods, services and facilities accessible to individuals with disabilities. The Department of Justice, responsible for the enforcement of Title III, in general has interpreted the law as covering transactions with e-commerce and transactions occurring on the Internet. So far, progress under Title III has been most marked in the area of settlement agreements requiring greater accessibility of bank ATMs and websites.

Section 255 of the Telecommunications Act of 1996

www.access-board.gov/telecommunications

This section requires manufacturers and vendors of telecommunications equipment and services, and customer premises equipment, to make their products accessible to and usable by individuals with disabilities if it is readily achievable to do so. If such accessibility and usability are not readily achievable, then compatibility with assistive technology, commonly used by people with disabilities, is required if readily achievable.

Section 255 covers many Electronic & Information Technology devices, particularly those involving voice communication over phone lines and telephone services. Telecommunication products covered by Section 255 include:

- wired and wireless telecommunication devices, such as telephones (including pay phones and cellular phones) pagers and fax machines;

- other products that have a telecommunications service capability;

- equipment that carriers use to provide services, such as a phone company's switching equipment.

The possible functions of a product are key in determining coverage. An example frequently used is televisions, which generally would not be covered, unless they include a set top-box enabling e-mail communication or Internet access and then, only that device is covered.

In order for the standards to be operable, a Telecommunications Access Advisory Committee was established. This committee provides a platform for ongoing interaction between government, industry, and the disability community.

Section 255 makes clear that technology cannot be considered usable unless its associated instructions and manuals are usable. Therefore, manufacturers and service providers are obliged to find effective ways to make product or service information accessible to all customers.

Not covered by 255 are information services such as data transmission (including e-mail) and pictures.

The Access Board (described in chapter 4) was given responsibility for developing guidelines that spell out what makes telecommunications products accessible. The Board's guidelines, published in 1998, were developed with help from an advisory committee the Board created for this purpose.

Section 508 of the Rehabilitation Act, as Amended by the Workforce Investment Act of 1998

www.access-board.gov/508

Section 508 of the Rehabilitation Act is widely considered to represent the most far-reaching legal support for Electronic & Information Technology, requiring most federal agencies to "procure, develop, maintain and use" only accessible E&IT for their own use or use by the public.

Federal agencies, under this law, are to ensure that:

- federal employees with disabilities have access to and use of information and data that is comparable to that of federal employees without disabilities, unless an undue burden would be imposed on the agency; and

- individuals with disabilities who are members of the public seeking information or services from a federal agency, to have access to and use of information and data that is comparable to that provided by the public who are not individuals with disabilities.

The Access Board (described in chapter 4) was charged with developing technical and functional provisions to establish a minimum level of accessibility to information technology. These technology-specific provisions address:

- software applications and operating systems,

- web-based information or applications,

- telecommunications products,

- video or multimedia products,

- self-contained, closed products such as information kiosks and transaction machines, and

- desktop and portable computers.

Variety of commentary on effectiveness and impact of these laws

As pointed out in NCD's *The Accessible Future* report regarding Section 508, this law is considered a landmark, and

> it is expected to exert a powerful influence on design practices throughout industry, as manufacturers are unlikely to maintain two distinct lines of otherwise similar products, an accessible one for federal agency customers, and a less or inaccessible one for everyone else…. harnessing the leverage of the government's enormous purchasing power is in fact one of the main objectives of the law.[xxv]

Author and technology specialist Frank Bowe, Ph.D., commented in his June 2005 paper titled "Two Way Technologies: a History of the Struggle to Communicate," that "Progress has been made in a series of leaps, rather than steadily over time. What we see is that technological advances occur, which then trigger societal responses via laws and regulations. Those policies, in turn, spur further technological progress."[xxvi] He also noted:

> Today we actually need new policies more than new technologies. The 1996 Telecommunications Act requires accessibility for people with disabilities—but only for voice-level, or traditional, telephone service. The Act was written before the World Wide Web, IM, and e-mail became available to consumers. Similarly, the Act predated the emergence of broadband. And it excuses cable companies, even when they provide broadband and telecommunications services, from making their services and products accessible to people with disabilities.[xxvii]

IBM finds impact of 508 becoming global

Frances West, Director of IBM's World Wide Accessibility Center, described needed next steps in her 2005 testimony to the U.S. Senate Committee on Foreign Relations:

> The need for accessible information technology is acute across the globe. The global number of people with disabilities is expected to grow as the population ages. In response to this reality, the U.S. has led the world in developing a policy

for IT accessibility when it passed Section 508 of the Rehabilitation Act in 1998…. This law, with technical specifications defined within it, has had an impact far beyond the U.S. federal government and in fact, has had global reach. Section 508 has been important not only to those requiring accessibility but to the whole technology sector. Since the passing of Section 508 into law, the technology industry has invested significant technical and human resources in bringing products into compliance.[xxviii]

Industry magazine points to 508 as incentive

In June 2002, *Wired*, a widely read magazine about the computer industry, Kendra Mayfield pointed out that "Although Section 508 doesn't require private companies to alter their products, the law has provided an incentive for companies who want to do business with the U.S. government to build better accessibility features into their products." [xxix]

NCD Member reviews impact of 508 and 255

In reviewing whether national policy goes far enough, NCD Member Carol Novak made the following comments to a 2004 State of Technology Conference:

> Section 508 of the Rehabilitation Act and Section 255 of the Telecommunications Act are the two major pieces of national legislation that impact the accessibility of technology. Section 508…represents the most far-reaching source of legal authority for accessible E&IT…. The statute differs from conventional civil rights laws in imposing on federal agencies affirmative obligations that must be met well in advance of the occurrence of any discriminatory impact upon an individual with a disability. This law is basically an accessible design statute in that it mandates actions that will end up being far more costly or impossible to achieve if accessibility is not incorporated into product design. This mandate is combined with strong and clear enforcement by creating a civil rights remedy for its violation.[xxx]

Further, Novak notes, concerning section 255 of the Telecommunications Act, "one major limitation of Section 255 concerns the scope of telecommunications functions and services covered."[xxxi] For example, "not every function or service that is performed or received through the telephone network is covered by Section 255."[xxxii]

"It has been clearly demonstrated that the objectives cannot be solely achieved by legislative means; there must be a dynamic and continuing collaboration among the federal government, industry and consumers."[xxxiii]

Impact of 255

A new website, www.tecaccess.net reporting on implementation of accessible information technology, discusses the impact of Section 255: "Manufacturers and service providers, however, are finding that as they make products easier to use by people with disabilities, they often make them easier to use by everyone; some access features, such as vibrating alerts on pagers and talking caller ID, have benefits for all users." [xxxiv]

Needed Next: Design for Inclusion

In 2004 the National Council on Disability released a report, *Design for Inclusion: Creating a New Marketplace*, calling for manufacturers to incorporate universal design principles in new and upgraded products. The research report analyzed six product lines for accessibility and usability: ATM machines, cell phones, distance learning, personal digital assistants, televisions and voice recognition software.

NCD Chair Lex Frieden commented that the report clearly indicated that

> People with disabilities want to use the same products that everyone else uses. They do not want to be limited to specialized products that are more costly. Implementation of universal design is the best way to satisfy this desire of people with disabilities, while also providing more cost-effective products for all users.[xxxv]

IV. Case Studies

The following case studies of significant actors in the disability and information technology field have been selected to illustrate U.S. participation in recent international IT

initiatives as well as diversity of the players on the U.S. scene: government, academic, industry/private sector, and consortia involving various stakeholders, including non-profit or private voluntary organizations.

Government

Department of Defense: Computer/Electronic Accommodations Program (CAP)

www.tricare.osd.mil/cap

CAP was established in 1990 as a centrally funded program for DoD to ensure that its employees had the assistive technology they needed to do their jobs. After 10 years of building up this area of expertise, in 2000 the National Defense Authorization Act granted CAP the authority to provide assistive technology, devices and services to any department or agency in the federal government. Therefore, CAP is now the federal government's centrally funded accommodations program, providing assistive technology solutions at no cost to the requesting agency.

CAP's new mission since 2000 has been to provide assistive technology and accommodations to ensure that people with disabilities have equal access to the information environment and equal opportunities in the Department of Defense and throughout the federal government. It works to increase the representation and retention of people with disabilities in the federal sector.

The CAP program has partnerships with 61 federal agencies, which are provided with assistive technology and accommodations to ensure that employees with disabilities have equal access to the information environment and employment opportunities. The program recognizes that although the costs of accommodations are often small, it is frequently used as an excuse for not bringing people with disabilities into the workforce.

The Department of Defense is the leading governmental employer of people with disabilities, and as such has developed substantial expertise in reasonable accommodation in the workplace.

Since its inception, the program has filled more than 40,000 requests for accommodations in the workplace. Overall, in assistive technology, the trends are clear: prices have gone down and the quality of the technology has gone up. There is also a marked increase in interest in telework: in 2004 alone, more than 200 requests were filled to accommodate employees who asked to work at home.

CAP services assist in creating work environments that are more accessible to employees with hearing, visual, dexterity, intellectual and communication disabilties. The CAP program also takes a serious interest in the international exchange of information and expertise and regularly participates in international consultations and conferences designed to accomplish that exchange. The CAP Program also receives an ongoing stream of international visitors and researchers seeking briefings about its policies, achievements, outreach, and other expertise.

Another DoD centrally funded program is the Workforce Recruitment Program, bringing college students with disabilities into the governmental workforce as summer interns, with the possibility of future employment.

DoD also funds research that has greatly benefited employees with disabilities. As one example, voice recognition was developed by DOD for use by pilots. It is now one of the most commonly used technologies for people with serious dexterity disabilities.

The Access Board: New International Collaboration

www.access-board.gov

The Access Board is an independent federal agency dedicated to accessibility for people with disabilities. It was created in 1973 to ensure access to federally funded facilities and is now a leading source of information on accessible design.

The Board develops and maintains design criteria for the built environment, transit vehicles, telecommunications equipment, and for electronic and information technology.

It also provides technical assistance and training on these requirements and on accessible design and continues to enforce accessibility standards that cover federally funded facilities.

The Access Board is responsible for development of standards for implementation of the legislation advancing information technology to benefit Americans with disabilities, as well as acting as a central information resource about these activities. Standards and Guidelines developed so far include: Electronic and Information Technology Accessibility Standards (2000), Telecommunications Act Accessibility Guidelines (1998), ADA Accessibility Guidelines (ADAAG) (1991, as amended through 2002), and Uniform Federal Accessibility Standards (1984).

Half of the members of the Board are representatives from most of the federal departments and the other half is comprised of members appointed by the President, a majority of whom must have a disability. Delegations from other nations periodically consult the Access Board on accessible design in the U.S. and its accessibility guidelines and standards. Most recently, representatives were received from Norway and China. In light of trends supporting global standardization, the Board has begun to develop plans to become more proactive internationally, including participation in projects with the European Commission and the World Bank.

In March, the Board participated in a videoconference organized jointly by the U.S. and European Commission on the use of Information and Communication Technology (ICT) standards and the possibility for governmental cooperation to move towards global requirements. The objective for the exchange is to minimize bilateral trade friction and advance a better understanding of the respective U.S. and European goals in the ICT sector, the range of regulatory and alternative tools available to meet these goals and the various methods by which technical standards and other documents are developed. In addition to Board staff, participants included representatives from the U.S. Department of Commerce, U.S. Department of State, the General Services Administration and their counterparts in the European Commission.

The Board is also participating in a new program on accessibility organized by the World Bank. Through a new partnership effort, the Bank seeks to heighten awareness of and develop guidance on accessibility and disability in funded projects, particularly those relating to civil works and infrastructure. The Access Board is serving on an advisory committee organized by the World Bank to oversee this program.

The Accessibility Forum

www.accessibilityforum.org/about

Sponsored by the General Services Administration, the Accessibility Forum began in 2001 as an ongoing collaboration between government, industry, and users to communicate on issues and areas where further effort could enhance E&IT accessibility. A coalition for accessibility, the Forum brings together stakeholders to support informed decisions about E&IT products relative to Section 508.

Forum membership includes over 640 organizations from industry (electronics, information technology and assistive technology), associations of people with disabilities, the

research community (academia, research institutions, standards groups), and government agencies.

As an example of activities, the Forum completed two projects on high priority issues: assessing compliance with the Access Board standards and examining differences between assistive technology projects and mainline information technology products.

The membership is moving towards an electronic based forum and currently provides support in research, web-based meeting coordination and planning, and related publicity.

Academic & Research Sector

The National Center on Accessible Information Technology (AccessIT)
www.washington.edu/accessit/about.php

The AccessIT Center at the University of Washington in Seattle serves to increase the access of individuals with disabilities to information technology in educational institutions at all academic levels nationwide. It is funded by the National Institute on Disability and Rehabilitation Research (NIDRR).

The Center develops and disseminates materials, training, and technical assistance that facilitate adoption of policies and practices leading to the increased use of accessible information technology in educational settings.

Some examples of accessible information technology in education are:

- accessible web pages, allowing students with disabilities, teachers and mentors to communicate with peers, and to take advantage of distance learning options;

- accessible instructional software (on disks, CDs or other media) and documentation that allow students with disabilities to participate side-by-side with their peers in computer labs and classrooms as they complete assignments; collaborate with peers; create and

view presentations, documents, spreadsheets; and actively participate in simulations and all other academic activities;

- accessible telecommunications and office equipment that makes communication and educational administrative functions accessible to those with mobility, visual and hearing impairments.

AccessIT works nationwide with NIDRR-funded projects, providing training support to the regional disability and business technical assistance centers (DBTACs).

Information Technology Technical Assistance and Training Center (ITTATC)
www.ittatc.org/about

Based at the Georgia Institute of Technology, the ITTATC Center is charged with providing accessibility training and technical assistance related to Section 508 of the Rehabilitation Act and Section 255 of the Telecommunications Act. The Center was created to help target audiences—industry, state officials, trainers and consumers—to understand the requirements of Sections 508 and 255 and to achieve success in their efforts to develop, market and buy accessible E&IT.

ITTATC is funded by the National Institute on Disability and Rehabilitation Research. It publishes a lively newsletter that has analytical articles and alerts about IT developments in the governmental, academic and private sectors, and announcements of all relevant conferences. It also offers specially tailored trainings.

ITTATC assistance involves personalized responses to in-depth questions, referrals to experts, discussion of accessibility issues surrounding important decisions and delivery of a wide range of products. The ultimate goal is to provide its customers with information that can be applied as they overcome barriers to achieving E&IT accessibility.

Assistance is tailored to three groups:

- businesses: to help them understand the requirements of Sections 508 and 255, become more aware of barriers encountered by people with disabilities and the varied solutions, find out about useful tools already available, and learn how to incorporate accessibility principles into the product design process;

- state governments: to help them learn what other states are doing to promote E&IT, and gain insight into successful approaches at the state level;

- consumers: to help them understand their rights under Sections 508 and 255, learn how to find accessible E&IT and gain insight into how to influence the product design process through focus groups and accessibility testing.

Standards Consortia (with participation of various stakeholders)

The Web Accessibility Initiative

www.w3.org/WAI

The Web Accessibility Initiative (WAI) is part of the World Wide Web Consortium (W3C). The W3C is committed to leading the web to its full potential, including promoting a high degree of usability for people with disabilities.

WAI is based at the Massachusetts Institute for Technology (MIT) in Cambridge. In coordination with other organizations around the world, WAI pursues accessibility of the web through five primary areas of work: technology, guidelines, tools, education and outreach, and research and development.

W3C/WAI work is developed through a consensus-based process including the different stakeholders in web accessibility: industry, disability organizations, government and accessibility research organizations. Work in W3C/WAI's technical activity includes ongoing review of all

W3C technologies under development; development of guidelines, techniques, and test suites for web content, browsers and media players, and web authoring tools; and development of resources to improve evaluation of web site accessibility. Work in W3C/WAI's international program office activity includes development of education and outreach resources to promote awareness and implementation of web accessibility; coordination with advanced research and development of web technologies; and a broad public discussion forum on web accessibility. One of the resources developed and maintained by its Education and Outreach Working Group is a reference list of policies relating to web accessibility around the world.

Another resource is Essential Components of Web Accessibility, which explains the interrelationships among the three primary guidelines relating to web accessibility: Web Content Accessibility Guidelines 1.0; Authoring Tool Accessibility Guidelines 1.0; and User Agent Accessibility Guidelines 1.0.

The DAISY Consortium

www.daisy.org/

The DAISY Consortium was formed in 1996 by talking book libraries to lead the worldwide transition from analog to Digital Talking Books. DAISY denotes the Digital Accessible Information SYstem.

DAISY members believe it promises to revolutionize the reading experience for those who have print or reading disabilities. The goal of the Consortium is that all published information is available to people with print disabilities at the same time and at no greater cost, in an accessible, feature-rich, navigable format.

The first DAISY standard was proprietary, originating in Sweden in 1994, based on the use of digital recording with some document structuring to enable easier navigation by the

reader. In its short history the DAISY specifications have evolved considerably and now offers much greater flexibility and superior reading experience for people who are blind or print disabled. They system is in use in Sweden, Japan, the United Kingdom and the USA.

The release of DAISY 3 format in 2002, was jointly developed by the DAISY Consortium, The National Library Service for the Blind and Physically Handicapped (part of the Library of Congress), and a variety of organizations in North America.

A DAISY book can be explained as a set of digital files that includes:

- one or more digital audio files containing a human narration of part or all of the source text;

- a marked-up file containing some or all of the text (optional);

- a synchronization file to relate markings in the text file with points in the audio file; and

- a navigation control file which enables the user to move smoothly between files while synchronization between text and audio is maintained.

There are 12 full members of DAISY, more than 45 associate members and 15 friends, active in North America, Europe and Asia. Members participate in DAISY trainings, technical consultations, conferences, and contribute to the newsletter.

Acknowledgements

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