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REHABILITATION ENGINEERING RESEARCH CENTER ON  
MOBILE WIRELESS TECHNOLOGIES FOR PERSONS WITH DISABILITIES

# U.S. Wireless Policy and People with Disabilities: A Status Report

Prepared for the European Commission, Brussels  
Information Society Directorate-General  
Elderly & People with Disabilities Unit



Office of Technology Policy and Programs  
An OTP Policy Study, August 2004

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GEORGIA CENTERS FOR ADVANCED  
TELECOMMUNICATIONS TECHNOLOGY

**REHABILITATION ENGINEERING RESEARCH CENTER ON MOBILE WIRELESS TECHNOLOGIES FOR PERSONS WITH  
DISABILITIES (WIRELESS RERC)**

AND

**GEORGIA CENTERS FOR ADVANCED TELECOMMUNICATIONS TECHNOLOGY (GCATT)  
OFFICE OF TECHNOLOGY POLICY AND PROGRAMS (OTP)**

**OTP POLICY STUDY NO. 90104**

**U.S. WIRELESS POLICY AND PEOPLE WITH DISABILITIES: A STATUS REPORT**

PREPARED FOR THE EUROPEAN COMMISSION, BRUSSELS  
INFORMATION SOCIETY DIRECTORATE-GENERAL  
ELDERLY AND PEOPLE WITH DISABILITIES UNIT

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# **U.S. Wireless Policy and People with Disabilities: A Status Report<sup>1</sup>**

## **1.0 Introduction: Looking Overseas**

In March 2003, the “Accessibility for All” conference<sup>2</sup> was held in Nice, France, to examine the role of standards establishment in improving access to a variety of modern products, services and environments for all – the young, old, and people with disabilities or special needs. The event was organized by three European Standardization Organizations (ESOs) - the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunications Standards Institute (ETSI), to contribute to the objectives of the European Commission eEurope Initiative. The year 2003 was designated as the “European Year of People with Disabilities.” One defined theme of the conference was “Looking Overseas.” The session which focused on this theme produced four recommendations: (1) Promoting international activities; (2) Sharing international experiences; (3) Creating incentives to support product development; and (4) Improving access to information.

Like our international colleagues, the Rehabilitation Engineering Research Center on Mobile Wireless Technologies for Persons with Disabilities (Wireless RERC) supports the significant goal of having educators and business decision makers become more knowledgeable about accessibility issues and products that have accessibility features. Further, in the United States, policy analysts maintain that legislators and regulators must also be a part of this process. Stakeholders periodically share findings and provide information on the issues related to technology and disabilities to law makers and regulators. Synergistic communication between legislators, regulators and policy makers helps to increase independence, increase employment, and improve the quality of life for many people with disabilities, thus reducing dependence on revenue generated by taxpayers.

To examine the progress made in the wireless and disability arena, a major international conference “State of Technology on Mobile Wireless Technologies for Persons with Disabilities,” was held in May 2004 in Atlanta, Georgia U.S.A. The organizers convened stakeholders from eleven countries. One-quarter of the attendees had a disability. Domestic and international stakeholders from government, regulatory agencies, state legislatures, consulates, user groups, universities, rehabilitation centers, advocacy groups, manufacturers, designers, and wireless companies came together to discuss advances in wireless communications and disability research and to share knowledge about the potential for wireless products to assist persons with disabilities in the present and future.

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<sup>1</sup> This research was conducted by the Rehabilitation Engineering Research Center on Mobile Wireless Technologies for Persons with Disabilities (Wireless RERC), funded by the National Institute on Disability and Rehabilitation Research of the U.S. Department of Education, grant number H133EO10804. The opinions contained in this report are those of the grantee and do not necessarily reflect those of the U.S. Department of Education.

<sup>2</sup> Accessibility for All --- [[www.etsi.org/cce/report.html](http://www.etsi.org/cce/report.html)]. See Section 5: “Looking overseas.”

The research, development and policy objectives of the conference were to encourage domestic and global collaborations on projects of mutual interest. The conference was organized by the Wireless RERC.<sup>3</sup> The Wireless RERC collaborates with leading researchers, practitioners, primary users, designers and academicians on both sides of the Atlantic involved in investigating the intersection of wireless technology development and rehabilitation research and practice. The subject areas of the conference and initial findings closely aligned with topics identified by the European conference stakeholders.

This White Paper has been prepared to offer a status report on our assessment of the role and potential of mobile wireless in the United States to assist persons with disabilities. The Wireless RERC anticipates this report will be of value to the international community. In addition, it presents the initial findings from the Wireless RERC State of Technology conference on critical disability issues including user needs, regulatory and policy challenges, and the development of advanced wireless applications. A full analysis of the conference will be completed by early 2005, at which time the proceedings will be released. By joining in this international process we hope to help identify likely outcomes and a path to a future that is more inclusive of all citizens.

## **2.0 Background: The U.S. Wireless Policy Landscape in the Disabilities Context**

Mobile wireless information and communication technologies (ICTs) have emerged as an important medium in which to communicate as well as to conduct transactions and to obtain information to assist in navigating daily activities. Deployment and adoption of new wireless technologies including cell phones and mobile computers could greatly increase the independence of people with disabilities. Barriers (such as lack of awareness, economic, technological and regulatory) to the use of these technologies by people with disabilities can be mitigated through the development of appropriate policy.

In the United States, the community of people with disabilities and those with a connection to people with disabilities represents a sizeable yet inadequately studied population (Access Board 2000). An estimated 49.7 million men, women and children have a disability that impacts their everyday activities (Census 2003). While 63 percent of people with disabilities say that life has improved in the past decade, many individuals are still in need of support and assistance (NOD 2002). Wireless technologies and mobile devices could be a key to helping persons with disabilities overcome the unique and diverse challenges they face. Only 25 percent of persons with disabilities own a computer, compared to 66 percent for non-disabled adults. In addition, only 20 percent of people with disabilities have access to the Internet, compared to over 40 percent of U.S. adults who are classified as non-disabled (Kaye 2000). While no comparable statistics catalog the use of wireless technologies by people with disabilities, we can assume that the use is proportionate. A user survey of the Consumer Advisory Network of the Wireless

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<sup>3</sup> The Wireless RERC [[www.wirelessrerc.org](http://www.wirelessrerc.org)] is funded by the U.S. Federal government to research and develop mobile wireless technologies and ensure equitable access to products and services while also exploring innovative applications addressing the needs of people with disabilities.

RERC<sup>4</sup> indicated that 86 percent of those surveyed would be interested in trying out a prototype of a new wireless device, indicating that interest in wireless technology is just as strong in the disability community as it is in the general population.

The development of wireless technologies is influenced by a variety of factors including economic variables, key stakeholders such as policymakers, regulators, manufacturers, other industry interests, and end-users.

### **3.0 U.S. Federal Policy and Regulatory Arena**

In the United States, the regulation of wireless technology development at the Federal level is handled by several administrative bodies, depending on the area involved. Disability policy is generated by other administrative bodies. Agencies with some degree of concern include the Federal Communications Commission, the National Telecommunications and Information Administration, the Food and Drug Administration, the National Council on Disability, and the Access Board.

#### **3.1 Policy Arena**

##### **3.1.1 National Telecommunications and Information Administration (NTIA)**

The National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce is the Executive Branch agency principally responsible for domestic and international telecommunications and information *policy* issues. In addition to representing the Executive Branch in both domestic and international telecommunications and information policy activities, NTIA (1) Manages Federal use of the spectrum; (2) Administers infrastructure grants to support the development of an accessible national information infrastructure; (3) Manages public telecommunications facilities grants designed to maintain and extend the public broadcasting infrastructure; (4) and performs cutting-edge telecommunications research and engineering, including resolving technical telecommunications issues for the Federal government and private sector. The expertise of the agency extends to every aspect of telecommunications, including community network applications, domestic policy, international policy, spectrum management, and telecommunications research and engineering.<sup>5</sup> Key issues of concern to the NTIA include: efficient management of spectrum; universal service; ensuring that schools, libraries, and other public institutions are connected to the emerging telecommunications infrastructure; global liberalization of telecommunications markets; digital television broadcasting; electronic commerce and the associated privacy, content regulation, copyright protection, and taxation issues; public safety and law enforcement; and concentration of ownership in telecommunications and media industries.<sup>6</sup>

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<sup>4</sup> [[www.wirelessrerc.org](http://www.wirelessrerc.org)]: see Research Project “R1: Assessment of User Needs”.

<sup>5</sup> Source National Telecommunications and Information Administration (NTIA) [<http://www.ntia.doc.gov/ntiahome/aboutntia.htm>]

<sup>6</sup> NTIA [<http://www.ntia.doc.gov/ntiahome/aboutntia.htm>].

### **3.1.2 National Council on Disability (NCD)**

The National Council on Disability (NCD) is an independent Federal agency responsible for making recommendations to the Congress and the President on issues affecting Americans with disabilities. Composed of 15 members appointed by the President, NCD is the official Federal advocacy group for people with disabilities. As a policy council, it coordinates no services or programs, but its recommendations can have tremendous impacts on Federal disability policy. Most notably, NCD was responsible for the landmark Americans with Disabilities Act. NCD produces policy papers, gives presentations to policymakers, and testifies before Congress on disability issues.

### **3.1.3 Access Board**

The Access Board is an independent Federal agency devoted to accessibility for people with disabilities. It was originally created as the Architectural and Transportation Barriers Compliance Board in order to implement the Architectural Barriers Act, which required government-funded facilities to be accessible. The Access Board develops and maintains accessibility guidelines for the built environment, transit vehicles, telecommunications equipment, and information technology. These guidelines serve as the baseline for the accessibility standards that are enforced. The Access Board also provides technical assistance and training to various organizations and groups, and it conducts a small amount of research into a number of accessibility issues.

## **3.2 Regulatory Arena**

### **3.2.1 Federal Communications Commission (FCC)**

The Federal Communications Commission (FCC) is an independent government agency established by Congress to regulate interstate and international communications by radio, television, wire, satellite, and cable. The Commission derives its authority from Acts of Congress, and primarily from one authorizing statute: the Communications Act of 1934 (as amended by The Telecommunications Act of 1996). The FCC is governed by five Commissioners (only three of whom may be of the same political party) who are appointed by the President and confirmed by the Senate for five-year terms. Although the President can be expected to appoint Commissioners who share his political beliefs and policy goals, the President does not have authority over the Commission's actions. Only Acts of Congress or intervention by the courts can change Commission rulings.

The FCC is responsible for ensuring competitive telecommunications markets are available to all consumers in the United States. Historically, this has meant regulation of the monopolistically-controlled telecommunications infrastructure and interstate interconnection agreements among local and long-distance telephone service providers, tasks with which the FCC has shared its jurisdiction with state-level regulatory commissions. Since the telecommunications industry deregulated, the FCC has focused on removing regulatory burdens and barriers to competition and facilitating the deployment of advanced telecommunications services, including broadband and wireless services. The FCC has also focused on improving

the efficiency of spectrum use in order to encourage innovative communications technologies. The FCC's current strategic goals include promoting broadband, increasing competition, increasing spectrum efficiency, promoting competition and diversity in media, and protecting national communications and information infrastructure.

### **3.2.2 Food and Drug Administration (FDA)**

The Food and Drug Administration (FDA) is an independent government agency responsible for ensuring the safety of drugs, biological products, medical devices, the U.S. food supply, and other substances which humans rely on for their health and well-being. As a result, the FDA is responsible for regulatory safeguards on some technologies for people with disabilities. The FDA's Center for Devices and Radiological Health (CDRH) must determine that all medical devices are safe and effective before they can be marketed in the U.S.<sup>7</sup> The FDA also ensures that all products emitting radiation are safe for human use. Thus, the FDA's standards can affect the deployment of wireless technologies, especially assistive wireless technologies. The FDA facilitates development of new devices by publishing standards for design that meet safety requirements.

## **3.3 Other Key Disability Policy and Regulatory Agencies**

### **3.3.1 Office of Special Education and Rehabilitative Services (OSERS)**

The Office of Special Education and Rehabilitative Services (OSERS), located in the U.S. Department of Education, supports programs that help educate children and youth with disabilities, provides for rehabilitation of youth and adults with disabilities and supports research to improve the lives of people with disabilities.<sup>8</sup> Through its three program offices, OSERS coordinates a large part of the Federal government's disability policy. It supervises the Office of Special Education Programs, the Rehabilitative Services Administration, and the National Institute on Disability and Rehabilitation Research. It is responsible for implementing the Individuals with Disabilities Education Act, the Rehabilitation Act, the Assistive Technology Act, and other major pieces of legislation.

### **3.3.2 National Institute on Disability and Rehabilitation Research (NIDRR)**

The National Institute on Disability and Rehabilitation Research (NIDRR), also organizationally located in the U.S. Department of Education, provides leadership for a comprehensive research program for the rehabilitation of individuals with disabilities. As part of the scientific community, NIDRR focuses on research in areas such as employment, health and function, technology access, independent living and community integration, and other disability issues. NIDRR conducts its work through a network of projects and centers of excellence. Over two dozen Rehabilitation Research and Training Centers (RRTC) and Rehabilitation Engineering Research Centers (RERCs) evaluate and disseminate innovative technology solutions for people with disabilities and provide training and education assistance. In addition to the body of research generated by the RERCs, NIDRR sponsors grants for assistive

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<sup>7</sup> Food and Drug Administration Fact Sheet: [<http://www.fda.gov/opacom/factsheets/justthefacts/5cdrh.html>].

<sup>8</sup> OSERS Mission statement. Online at [<http://www.ed.gov/about/offices/list/osers/mission.html>].

technology development. NIDRR's emphasis on technology is part of its mission to set the course for the future of disability research.

### **3.3.3 General Services Administration (GSA)**

The General Services Administration (GSA) provides assistive technology solutions through its Center for Information Technology Accommodation (CITA). It coordinates Federal government accessibility efforts, especially with respect to information technology. A Usability Solutions Group works towards making electronic services more usable and accessible for all. This Group works with Federal agencies to develop guidelines and standards for e-government efforts. GSA's efforts are administrative in nature, so they have little impact on national policymaking, but the agency's actions impact the accessibility of Federal government services and information.

## **3.4 Other Key Stakeholders**

A number of other stakeholders are involved in the policy development and regulatory process. A representative list of not-for-profit and industry organizations with some degree of interest in telecommunications or other communications and assistive type technologies follows.

### **3.4.1 Membership Associations and Not-for Profits**

Membership associations for people with disabilities, with an interest in information technologies and disability related issues:

- *American Council of the Blind* strives to improve the well-being of blind and visually impaired people by serving as a representative national organization. [[www.acb.org](http://www.acb.org)]
- *Cornucopia of Disability Information (CODI)*, a resource for consumers and professionals providing disability information in a wide variety of areas including assistive technology and universal design. [[www.codi.buffalo.edu](http://www.codi.buffalo.edu)]
- *Infinitec, Inc.* is a not-for-profit corporation formed to help people with disabilities access life-enhancing technologies. [[www.infinitec.org](http://www.infinitec.org)]
- *International Center for Disability Resources on the Internet (ICDRI)* is a non-profit public policy center with a mission of working toward equalization of opportunities for persons with disabilities. [<http://www.icdri.org>]
- *National Association of the Deaf (NAD)* the oldest and largest constituency organization safeguarding the accessibility and civil rights of 28 million deaf and hard of hearing in the U.S. [[www.nad.org](http://www.nad.org)]
- *National Federation of the Blind* provides public education about blindness, information and referral services, scholarships, literature and publications about blindness, aids and appliances and other adaptive equipment for the blind, advocacy services and protection of civil rights, development and evaluation of technology and support. [[www.nfb.org](http://www.nfb.org)]

- *National Organization on Disability* (NOD) promotes equal participation for U.S. residents with disabilities. NOD's two core programs, Community Partnership Program (CPP) and National Partnership Program (NPP) connect people with and without disabilities at the national, state and local levels. [[www.nod.org](http://www.nod.org)]
- *Self Help for Hard of Hearing People* (SHHH) represents consumers by providing information, education, support and advocacy to hard of hearing people. [[www.shhh.org](http://www.shhh.org)]
- *TDI (Telecommunications for the Deaf, Inc.)* is an active national advocacy organization concentrating on equal access issues in telecommunications and media for four constituencies in deafness and hearing loss: people who are deaf, hard-of-hearing, late-deafened, or deaf-blind. [[www.tdi-online.org](http://www.tdi-online.org)]
- *The Rehabilitation Engineering and Assistive Technology Society of North America* (RESNA) is a national association dedicated to improving the potential of people with disabilities through the use of technology. [[www.resna.org](http://www.resna.org)]
- *United Cerebral Palsy Association* (UCP) advances the independence, productivity and full citizenship of people with cerebral palsy and other disabilities. [[www.ucp.org](http://www.ucp.org)]
- *World Institute on Disability* (WID), a public policy center, conducts research, training, advocacy, and public education so that people with disabilities can enjoy increased opportunities to live independently. [[www.wid.org](http://www.wid.org)]

### 3.4.2 Federally funded groups

The following include federally funded organizations geared toward providing information and training to businesses and governments. Many of these organizations provide specific information related to certain products, such as hearing aids, and focus on the individual rather than on community impacts.

- *ABLEDATA*, a Federally funded NIDRR project whose primary mission is to provide information on assistive technology (AT) and rehabilitation equipment available from domestic and international sources for consumers, organizations, professionals, and caregivers. [<http://www.abledata.com/>]
- *National Rehabilitation Information Center* (NARIC), funded by the National Institute on Disability and Rehabilitation Research (NIDRR), collects and disseminates the results of federally funded research projects. [[www.naric.com](http://www.naric.com)]
- *IT Technical Assistance and Training Center* (ITTATC) is a partnership between The Center for Assistive Technology and Environmental Access (CATEA) at Georgia Institute of Technology, WID, Community Options, Inc. (COI), Rehabilitation Research and Training Center (RRTC) on Workforce Investment and Employment Policy, and Information Technology of America (ITAA). ITTATC is a collaboration of educators, researchers, policy analysts, and industry and disability leaders whose mission is to promote use of accessible and useable electronic and information technology and universal design to manufacturers, product designers and engineers. [<http://www.ittatc.org/>]

### 3.4.3 Federally funded research centers

The following group includes federally funded research centers and rehabilitation engineering research centers (RERC) dedicated to disability issues, and communications technologies.

- *RERC on Communication Enhancement* at Duke University incorporates several activities that focus on augmentative and alternative communication (AAC) technologies. [[www.aac-rerc.com](http://www.aac-rerc.com)]
- *RERC on Hearing Enhancement* at Gallaudet University focuses on development and evaluation of technology to accommodate the needs of people with hearing loss. [[www.hearingresearch.org](http://www.hearingresearch.org)]
- *RERC on Information Technology Access* at University of Wisconsin, Madison, focuses on improved access by individuals with disabilities to a wide range of technologies, including computers, Internet technologies. [[trace.wisc.edu/itrerc](http://trace.wisc.edu/itrerc)]
- *RERC on Technology Transfer* at the University of Buffalo advance the methods of technology transfer to facilitate the commercialization of assistive devices. [[cosmos.buffalo.edu/t2rerc](http://cosmos.buffalo.edu/t2rerc)]
- *RERC on Telecommunication Access* at University of Wisconsin, Madison, identifies telecommunication access barriers in current and future technologies and works with others in the field to identify solutions. [[trace.wisc.edu/telrerc](http://trace.wisc.edu/telrerc)]

### 3.4.4 Industry related organizations

Industry groups also involved in policy development include services providers such as Verizon, Cingular, T-Mobile and Sprint; manufacturers such as Nokia, Motorola, Sony Ericsson, Samsung, and LG; trade groups and other advocacy and interest groups. The following group represents industry organizations that are disseminating information about policy, as well as conducting research addressing the needs of the disabled community.

- *Assistive Technology Industry Association (ATIA)* is a not-for-profit organization representing manufactures and merchants of technology-based assistive devices for people with disabilities. [[www.atia.org](http://www.atia.org)]
- *Cellular Telecommunications and Internet Association (CTIA)* is an international organization that represents the wireless communication communities and serves the interests of service providers and manufactures. [[www.ctia.org](http://www.ctia.org)]
- *InterNational Committee for Information Technology Standards (INCITS)*, represents U.S. based providers of IT related products and services. [<http://www.incits.org/>]
- *International Society for Augmentative & Alternative Communications (ISAAC)* promotes optimal communication for people with severe communication limitations. [[www.isaac-online.org](http://www.isaac-online.org)]

Again, while this list is not meant to be exhaustive, it is representative of the importance of the issues. This White Paper does not attempt to analyze the work of all the above groups but

rather to focus on the intersection between mobile wireless and its potential to assist people with disabilities in the United States.

## **4.0 FCC, Wireless Technologies and Disability Issues**

The FCC has developed a number of initiatives to increase access and reduce barriers to the use of wireless technologies for people with disabilities. Specific disability issues are coordinated by the Disability Rights Office (DRO)<sup>9</sup> in the FCC's Consumer and Governmental Affairs Bureau (CGAB). General telecommunications policies that affect people with disabilities may also be handled by other parts of the agency, such as the Wireless Telecommunications Bureau.

While the FCC has some responsibility for ensuring people with disabilities have access to telecommunications services, most of its disability-related initiatives are regulatory or administrative actions required by legislation such as the Americans with Disabilities Act (ADA) and Section 255 of the Communications Act. Although disability issues fall within the Commission's mandate to act "in the public interest," the Commission has not used that authority to create bold initiatives for people with disabilities. This is due to a combination of legal constraints on the Commission's authority and the large scope of the Commission's jurisdiction. The FCC is first and foremost a regulatory authority over the communications sector. The Commission's CGAB in an effort to decrease barriers for people with disabilities has initiated forums on several disability related issues including emergency communications and homeland security, Voice over Internet Protocol technology (VoIP), and the role of wireless technologies in bridging the communications gap for people with physical and developmental disabilities. There is however, no coordinated framework for wireless technologies and people with disabilities. The Commission prefers to promote wireless technologies separately from its disability initiatives. This is reflected in the organization's structure noted above.

### **4.1 Key Issues**

The FCC has in recent years identified a series of key issues that impact wireless technologies and people with disabilities. These include (in no particular order): *Telecommunications Relay Services (TRS), Emergency Alert System (EAS,) Product Accessibility, IP-Enabled Services, Wireless Broadband/Universal Service.*

#### **4.1.1 Telecommunications Relay Services (TRS)**

The FCC is responsible for overseeing Telecommunications Relay Services (TRS) that allow people with hearing and/or speech disabilities to interact with standard voice users on the public telephone network. While many aspects of TRS have been codified by law, the FCC has been investigating how new technologies can expand relay services to meet changing needs and demands. Specifically, the shift towards Internet Protocol (IP)-Enabled services presents both

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<sup>9</sup> [<http://www.fcc.gov/cgb/dro/>].

challenges and opportunities for people with disabilities relying on the public telephone network for communication. The convergence of voice, video, and data services raises questions about the future of relay services and how citizens can communicate intermodally. Of note, the FCC initiated rulemaking proceedings (FCC 04-137) in June addressing the future of IP relay and video relay services, potentially drivers for broadband services.<sup>10</sup>

#### **4.1.2 Product Accessibility**

Section 255 of the Telecommunications Act requires that manufacturers and service providers make their equipment and services accessible to people with disabilities when readily achievable. The FCC is responsible for enforcing this law and it works with people with disabilities to resolve their complaints with companies. As broadband and wireless data expand telecommunications services, conflicts in the U.S. regulatory regime (between “information” vs. “telecommunications” services) create uneven accessibility standards. This can result in severe problems for people with disabilities trying to adapt to the information age. The FCC receives both formal and informal complaints from consumers about the inaccessibility of telecommunications products and services. In February 2000, the Commission’s rules to implement Section 255 went into effect, and it carries out enforcement actions for violation of those regulations.<sup>11</sup>

#### **4.1.3 Emergency Alert System (EAS)**

The EAS is composed of broadcast networks; cable networks and program suppliers; AM, FM, Low Power FM (LPFM) and TV broadcast stations; Class A television (CA) stations; Low Power TV (LPTV) stations; cable systems; wireless cable systems which may consist of Multipoint Distribution Service (MDS), Multichannel Multipoint Distribution Service (MMDS), or Instructional Television Fixed Service (ITFS); and other entities and industries operating on an organized basis during emergencies at the National, State and local levels.

The FCC recently issued a Notice of Proposed Rulemaking (NPRM) (FCC 04-189) on the Emergency Alert System (EAS), seeking comment on how EAS can be improved to be a more effective mechanism for warning the American public of an emergency. The NPRM also addresses the need for comments on the topic of providing emergency information and alerts for individuals with disabilities. The NPRM stems in part from recommendations of the Media Security and Reliability Council (an FCC Advisory Committee), and the Partnership for Public Warning. The Commission seeks participation of state and local emergency planning organizations, the disability community, as well as the communications industries involved in alerts and warnings.

The FCC’s commitment to making sure that equal access to public warning for persons with disabilities is evident not only through the proposed EAS changes but also through other requirements. The commission requires, for instance, that all distributors of video programming

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<sup>10</sup> . [FNPRM: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-04-137A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-137A1.pdf)]. More information about the Commission’s TRS efforts is available at [<http://www.fcc.gov/cgb/dro/trs.html>].

<sup>11</sup> [[http://www.fcc.gov/Bureaus/Common\\_Carrier/Orders/1999/fcc99181.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Orders/1999/fcc99181.pdf)] More information about the FCC’s accessibility rules can be found at [<http://www.fcc.gov/cgb/dro/section255.html>].

that provide emergency information must make it available in a format accessible to persons with hearing and vision limitation.<sup>12</sup>

#### **4.1.4 IP-Enabled Services**

The Internet is revolutionizing the telecommunications sector, and the convergence of voice, video, and data services offers great opportunities for people with disabilities. Because Internet Protocol is a uniform standard, establishing accessible standards for IP-based services can have a tremendous impact on the provision of services worldwide. At the same time, the interaction between IP-based networks and traditional networks poses challenges for accessibility and public safety. The FCC is examining services such as Voice over Internet Protocol (VoIP) carefully to ensure that all individuals can take advantage of advanced capabilities, although the FCC does not currently have regulatory authority over VoIP. The FCC proposed rules (FCC 04-28) concerning IP-enabled services in February 2004, seeking comment on appropriate regulatory regimes for the new services.<sup>13</sup> In May, the Commission held a summit to discuss how VoIP would affect people with disabilities.<sup>14</sup>

#### **4.1.5 Wireless Broadband/Universal Service**

Mobile wireless technologies can offer specialized information services in multiple formats for people with disabilities, enabling them to be integrated into the new economy. However, coverage is not yet comprehensive and inexpensive enough to guarantee accessibility for all. The FCC is focusing on making broadband services available to every American, and it is increasingly turning to wireless networks to achieve that goal. By reallocating spectrum and setting standards for cognitive “smart” radio systems, the FCC is focused on expanding wireless broadband in rural and underserved communities where many people with disabilities live. The FCC has initiated a number of proceedings related to wireless broadband. In May 2004 the Commission formed a Wireless Broadband Access Task Force charged with identifying ways to facilitate further deployment. In addition, the FCC hosted a forum on wireless broadband and proposed new spectrum allocation rules (FCC 04-135; FCC 04-113; FCC 04-100) that will foster growth in wireless services. The Task Force is currently investigating the issue and is seeking public comment.<sup>15</sup>

## **5.0 Wireless Rehabilitation Engineering Research and Development Policy**

While several RERCs have some research mission associated with telecommunications, communication, or information technology<sup>16</sup>, the Rehabilitation Engineering Research Center on Mobile Wireless Technologies for Persons with Disabilities (Wireless RERC) has the mission of “promoting universal access to mobile wireless technologies and exploring their innovative

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<sup>12</sup> See for instance 47 C.F.R. 73.1250, 79.1, 79.2, 79.3, as well as DA 03-2361.

<sup>13</sup> [[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-04-28A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-28A1.pdf)].

<sup>14</sup> Information is available at [<http://www.fcc.gov/voip/>].

<sup>15</sup> Information is available at [<http://www.fcc.gov/wbatf/>].

<sup>16</sup> See 3.4.3 section of this White Paper.

applications in addressing the needs of people with disabilities." The RERC has two primary aims: 1) ensure equitable access to mobile wireless products and services by people with disabilities of all ages and abilities; and 2) investigate promising applications of mobile wireless technologies in support of employment, independent living and community integration of people with disabilities. The Wireless RERC fulfills its mission through interrelated research, development, training, and dissemination activities which convey results and strategies to assist stakeholders. The activities are guided and evaluated by constituent advisory groups made up of consumers, rehabilitation professionals, wireless industry representatives and an Advisory Board that is representative of all the stakeholders including government.

The policy arm of the Wireless RERC is led by the Office of Technology Policy and Programs (OTP), Georgia Centers for Advanced Telecommunications Technology (GCATT). OTP has gained recognition as the source for neutral analysis of Federal and state technology policy that might impact on the development of advanced technologies such as wireless and broadband communications.<sup>17</sup> Legislative, regulatory and policy monitoring and analysis are conducted. Findings are shared with stakeholders to advance mobile wireless and universal accessibility goals for persons with disabilities. Strategies and recommendations are provided to policymakers and regulators to aid and improve mobile wireless technology applications in support of employment, independent living and community integration of people with disabilities. In particular the results of the policy research conducted by the Wireless RERC has established a body of credible, objective evidence that can be, and has been noted in influencing policy directions at the state and Federal levels.<sup>18</sup> While there is ongoing activity, there are three important projects with policy implications that the European Commission might find beneficial to its work regarding applications relating to persons with special needs. These projects are described below.

## **5.1 Baseline U.S. Wireless Policy Assessment**

The examination of the key issues at the intersection of disabilities and wireless technologies has previously not been undertaken by industry, government or the disability community. It was essential to create a baseline review that would provide pertinent information on the disability community and legislative and regulatory policies that meet at the crossroads of mobile wireless technology. One of the first policy related research initiatives of the Wireless RERC was a preliminary baseline policy assessment to examine the role that advances in wireless communications and related technologies play in providing the disabled community increased opportunities for daily interactions; and more specifically analyzes accessibility policy issues related to the use of wireless communications and other information technologies (GCATT 2002). The baseline assessment developed strategies and recommendations for policymakers and regulators to aid and improve mobile wireless technology applications in support of employment, independent living, and the community integration of people with disabilities. The policy study identified key issues facing disabled users of wireless technologies, including barriers to access and use, as well as opportunities for reducing those barriers.

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<sup>17</sup> Sample of major projects for the Governor of Georgia, state municipalities, the University System of Georgia and Federal files may be found on the [[www.gcatt.org](http://www.gcatt.org)] website under policy initiatives.

<sup>18</sup> See [[www.wirelessrerc.org](http://www.wirelessrerc.org)] policy reports and filings.

### **5.1.1 Key issues**

An initial set of disability, wireless and communication technologies related policy issues was identified through research of not-for-profit agencies, government resources, and policy journals, and consultation with key stakeholders. These policy issues included: 1) Affordability of assistive technology (AT) products, 2) Definition of telecommunication/information services (in a regulatory context), 3) Disability divide/access/awareness, 4) E-911 (wireless) call accuracy, 5) Inter-agency coordination, 6) New Freedom Initiative<sup>19</sup>, 7) Re-prioritizing the nation's disability and rehabilitation research agenda, 8) Spectrum allocation/availability, 9) Universal design and product development, and 10) Wireless device (in)compatibility.

### **5.1.2 Barriers**

In analyzing the intersection of disability policy and wireless technologies three underlying barriers to access/use appear to be relevant to this nascent environment of disability and technology collaboration: awareness and proficiency factors, economic barriers, and incompatible technologies.

#### ***5.1.2.1 Awareness/Proficiencies***

A primary concern associated with the deployment and use of wireless and other telecommunications technologies in general is a lack of awareness that a given technology exists, or that it could be of benefit (GCATT 2000). New wireless technologies regularly appear, and are rarely developed with consideration to specialized needs and requirements of persons with disabilities. Potential users of telecommunications technologies may be significantly uninformed as to their availability or utility. Stakeholders that could inform the public on assistive technologies, government, industry and not-for-profit organizations, frequently lack the appropriate resources, incentive, organization, or in some cases, simply the awareness that such efforts are necessary (GCATT 2002).

#### ***5.1.2.2 Economic Barriers***

Wireless devices tend to be prohibitively expensive to a population already more likely to be unemployed or receive government assistance. The potential value of such technologies has not been fully realized, and these devices are often not covered in the U.S. under private or employer-based health benefits, or the two primary public health insurance programs for persons with disabilities, Medicare and Medicaid.

#### ***5.1.2.3 Technology Incompatibilities***

Incompatibilities across products of different design, manufacturer, or purpose can create barriers to the efficient and effective operation of wireless devices. Some telecommunications and medical devices operate in overlapping or adjacent frequency spectrum ranges, raising the risk for interference and malfunction (FCC 2002). Designers and manufacturers of incompatible devices are not effectively collaborating (often due to different goals) to ensure that such vital devices are reliable and efficient in all circumstances and situations.

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<sup>19</sup> The New Freedom Initiative announced on February 1, 2001, by President George W. Bush is a comprehensive strategy for the full integration of people with disabilities into all aspects of American life. [<http://www.whitehouse.gov/infocus/newfreedom/>]

### 5.1.3 Opportunities

While a variety of policy options exist to reduce barriers to wireless technology access, the Wireless RERC focused on three principle areas of opportunity increase access/use of technologies: (1) *Policy/regulatory approaches*; (2) *Market mechanisms*, and (3) *outreach/awareness* prospects.

#### 5.1.3.1 Policy/Regulatory Approaches

Policy emphasizing public sector interventions on behalf of wireless telecommunications technologies can affect the success or failure of a product. Ideally policy initiatives, regulations, executive orders and other directives can encourage the development of new devices and services as well as reinforce the importance of technologies being accessible and useable by all people. Assistive wireless telecommunications technologies have long been thought of as very specific products designed for a relatively small fraction of the population – specifically, those persons who are disabled. However, as noted above, millions of U.S. residents may have some degree of disability under definitions supported by the Census Bureau. Further, the aging of the American population with the concurrent increase in age related infirmities will increase the total number of people in the United States with disabilities, or other functional limitations to daily living activities.

Since our initial policy assessment, some public sector activities have occurred that have the potential to increase the opportunity for increased wireless technology use among people with disabilities. Examples of these include:

- New Freedom Initiative, announced in 2001 by President Bush's, has the objective of eliminating remaining barriers to full integration into American life for people with disabilities. Focal areas include: 1) Increasing Access Through Technology; 2) Expanding Educational Opportunities for Youth with Disabilities; 3) Integrating Americans with Disabilities Into the Workforce; and 4) Promoting Full Access to Community Life A progress report was released in 2004 by the White House.<sup>20</sup>
- Hearing Aid Compatibility Act of 1988 (HAC Act) was modified in July 2003, by the Federal Communications Commission (FCC) to require that wireless phone manufacturers and wireless phone service providers make models of accessible digital wireless phones available to people who use hearing aids.
- New Rehabilitation Engineering Research Centers (RERCs) established. Since February 2001, the Department of Education's National Institute on Disability and Rehabilitation Research has funded seven additional Rehabilitation Engineering Research Centers (RERCs), including the RERC on Hearing Enhancement and the RERC on Workplace Accommodations. RERCs work to develop assistive and universally designed technologies and partner with industry and product manufacturers to transfer these technologies to the marketplace.

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<sup>20</sup> Available online at [<http://www.whitehouse.gov/infocus/newfreedom/toc-2004.html>].

- Assistive Technology Development Fund was allocated \$5 million in FY 2002, FY 2003, and FY 2004 to assist small businesses in the development and transfer of assistive technologies.
- Internationally, the inclusion of language regarding accessible communications technologies in the draft UN convention on persons with disabilities. Proposed language in the UN convention would encourage states to take actions recognizing the rights of persons with disabilities to access information and communications technologies and other services.<sup>21</sup>

### **5.1.3.2 Market Mechanisms**

A deficiency in quality research that documents the market potential of assistive wireless technologies and mobile devices has made it difficult to convince designers and manufacturers on the economic viability of such products. Not only are there more potential disabled consumers than previously thought, but manufacturers must also realize that assistive technologies can also benefit the non-disabled public at large.

Some recent activities that can help the market for assistive wireless technologies include:

- Cingular Wireless recently announced the development of a cellular application “TALKS” for the visually-impaired that responds to spoken commands with voice recognition technology and reads back to the user information such as menu options and text messages. Increased use of wireless services, and/or purchase of these phones would demonstrate that the previous lack of availability of accessible phones was a significant barrier.
- Voluntary standards – the InterNational Committee for Information Technology Standards (Incits)/V2 Technical Committee, a voluntary group with representation from the IT industry, device manufacturers, academia and consumer groups. V2 is currently developing standards for a Universal Remote Console (URC) framework of components that combine to enable remote User Interfaces and remote control of network accessible electronic devices and services. “This communication protocol complements and builds on industry activity in home networking, wireless networking, and metadata registries for discovery and interoperation of intelligent devices. The Universal Remote Console and related standards will ensure that IT products are more accommodating of the needs and preferences of the consumer by allowing for alternative interfaces. The option to change interfaces will have a broad market application.”<sup>22</sup>
- The National Organization on Disability (NOD), in cooperation with the Harris poll, conducted the 2004 NOD/Harris Survey of Americans with Disabilities, which provided information on the participation of Americans with and without disabilities in ten key areas of life<sup>23</sup>. For example, survey respondents were questioned regarding their use of

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<sup>21</sup> Article 19 (Accessibility), draft international convention on persons with disabilities. Compilation of proposed revisions and amendments made by members of the Ad Hoc Committee to the draft text presented by the Working Group as a basis for negotiations by Member States and Observers in the Ad Hoc Committee of the draft Convention.

[<http://www.un.org/esa/socdev/enable/rights/ahc3modfinal.htm>].

<sup>22</sup> [[http://www.incits.org/tc\\_home/v2.htm](http://www.incits.org/tc_home/v2.htm)]

<sup>23</sup> Findings from the 2004 NOD/Harris Survey of Americans with Disabilities is available at <http://www.nod.org/content.cfm?id=1537>.

assistive technologies. Findings of the survey indicated that Americans with disabilities rely heavily on assistive technology, with one third reporting that they would lose their independence without it. The results of the survey were made readily available to those in the disability community, industry representative, policy makers and other stakeholders.

### **5.1.3.3 Outreach/Awareness**

Again, the inefficient dissemination of information regarding available assistive and wireless telecommunications technologies, products and methodologies continues to be a barrier to the effective delivery, usage and understanding of such aides. The outreach and awareness efforts are vital to successful utilization. The Wireless RERC has identified four key venues through which information can be effectively disseminated to unknowledgeable, potential beneficiaries of assistive telecommunications technologies, products and methodologies including: industry or not-for-profit organizations, conferences, government entities and user forums.<sup>24</sup>

Examples of recent outreach/awareness activities include:

- The creation of Disabilityinfo.gov, a Web portal that makes the federal government's disability-related information and resources easily accessible to all Americans. Among other topics, the site provides information on accessibility, assistive and adaptive technology, technology laws and regulations and federal accommodations programs.
- The Department of Justice (DOJ) and the General Services Administration (GSA) have established web pages to provide technical assistance on Section 508 of the Rehabilitation Act (which requires that all electronic and information technology purchased, maintained, or used by the Federal government be readily accessible to and usable by individuals with disabilities).<sup>25</sup> The DOJ and the United States Access Board have provided technical assistance materials for web and software developers at the Access Board's website<sup>26</sup>. These websites can also be used as a resource for any party looking to find information on accessible technology.
- The Department of Defense (DOD) Computer/Electronic Accommodations Program (CAP) revised its website, making it easier to conduct an online analysis of workplace accommodation solutions for federal employees with disabilities<sup>27</sup>. CAP is responsible for providing computer and telecommunications assistive technologies for federal employees with disabilities.
- The Department of Commerce's Technology "Assessment of the U.S. Assistive Technology Industry," published in February 2003<sup>28</sup>. This assessment projects future growth of AT and describes the strengths and weaknesses of the industry as a whole.

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<sup>24</sup> For a full review of the Policy and Regulatory Assessment and annual updates see [[www.wirelessrerc.org](http://www.wirelessrerc.org)] and refer to Policy Initiatives division R3.

<sup>25</sup> The DOJ's web page is available at [www.usdoj.gov/crt/508/508home.html](http://www.usdoj.gov/crt/508/508home.html). The GSA's web page is available at [www.section508.gov](http://www.section508.gov)

<sup>26</sup> The Access Board's web page is available at [www.access-board.gov](http://www.access-board.gov).

<sup>27</sup> The CAP web page is available at <http://www.tricare.osd.mil/cap/>

<sup>28</sup> See [<http://www.icdr.us/atreportweb/>]

- The Wireless RERC recently hosted the “State of Mobile Wireless Technology for Persons with Disabilities,” described below. The objective of the conference was to establish a national dialogue among researchers, users, and industry to share knowledge about the current state and future directions of accessible technologies, with the intent of increasing awareness of both wireless technology development as well as an awareness on the potential markets that exist to serve the needs of people with disabilities.

## 5.2 State of Mobile Wireless Technology for Persons with Disabilities

The Rehabilitation Engineering Research Center on Mobile Wireless Technologies for Persons with Disabilities, “State of Mobile Wireless Technology for Persons with Disabilities Conference” established a dialogue among domestic and international stakeholders from eleven countries. The attendant specialists included researchers, users, government, and industry and promoted sharing knowledge about the current state and future directions of accessible mobile and wireless technologies.<sup>29</sup> A range of panels covering the areas of technology, user needs and policy were staged, as well as a series of nine facilitated roundtable discussions on broad areas of interest. Each roundtable, lead by a facilitator, identified three key issues and associated barriers and challenges, trade-offs and potential outcomes. Roundtable topics included: 1) Disability rights and technological accommodations: disability groups, standards groups and the design community; 2) Emergency communications: lifeline to public safety; 3) International parallels and departures: policy and practice; 4) The engaged consumer: training and outreach; 5) Overcoming barriers: product information, cost, and usability; 6) Policymakers, practitioners and the public, 7) International collaborations between industry and academia; 8) The accessibility curve for future wireless technologies; and 9) WiFi & WiMax<sup>30</sup> connecting the disability community.

### 5.2.1 Key issues

The members of the nine roundtables discussed some of the prominent topics relating to wireless telecommunications technologies and living with disabilities. The topics of discussion covered disability and telecommunications policies, technical aspects of telecommunications technology for people with disabilities, and factors that affect the research and design stages of product development. Participants identified the key areas that needed attention in each of the sessions and discussed solutions. An initial set of disability, wireless and communication technology related policy issues was subsequently identified through analysis of the roundtable summaries. These included: *Education/awareness, Market factors, Design factors/feasibility, Cost/Funding/Affordability, Accessibility, Reliability, and Interoperability/Standards.*

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<sup>29</sup> The conference [<http://www.wirelessrerc.gatech.edu/SOT/index.htm>] was held at the Georgia Centers for Advanced Telecommunications Technology (GCATT) building in midtown Atlanta and was jointly sponsored by The National Institute on Disability and Rehabilitation Research (NIDRR), the Federal Communications Commission (FCC), and the National Center for Dissemination of Disability Research (NCDDR). Visit the archival record for greater detail on presentations.

<sup>30</sup> 802.11b and 802.16.

### ***5.2.1.1 Education and Awareness: Challenges***

Throughout the nine roundtable discussions, education and awareness overwhelmingly emerged as a key issue impeding the availability of accessible products. It became clear that education and awareness efforts are needed among consumers, designers, and industry representatives alike. Consumers are not always aware of what products are available or what policies exist for protecting them. Industry representatives are not aware of the market for accessible products. Designers are not aware of who actually needs to use the products and are not trained to design products in an accessible manner. Recommendations: (1) Encourage politicians to give more weight to disability issues in their agendas, (2) Build business cases for the design of accessible products, (3) Educate designers on the needs of people with different types of disabilities through training and access to information databases, and (4) Consumers should be proactive and work together to communicate their needs to the industry.

### ***5.2.1.2 Design Factors: Challenges***

Design factors appeared as a key issue in four of the roundtable sessions. Many of the problems that were discussed involved a lack of designer training and understanding. The other major obstacle in the design process is a lack of consumer involvement in the design process. Consumers are often unsophisticated with the technology and are not aware of the possibilities of the technology to meet their accessibility needs. Finding a representative sample of consumers to give feedback and input is expensive and time-consuming. However, it is essential to involve consumers with disabilities if there is any hope of developing accessible products. Recommendation: Formation of testing groups was recommended in several of the sessions. Consumers who both have a disability and have tech training should be utilized as well.

### ***5.2.1.3 Market Factors: Challenges***

The market for disability accessible wireless products is often overlooked or underestimated. Marketing professionals need to be educated on the needs of people with disabilities and the importance of universal design. Recommendations: (1) Raise awareness among marketing professionals include using success stories to demonstrate how accessible products benefit people with disabilities, (2) Encourage consumers with disabilities to be proactive in advocating and lobbying for accessible products, and (3) Invest in better market research.

### ***5.2.1.4 Cost and Affordability: Challenges***

Financial obstacles can also prevent the development or attainability of wireless technology. Consumer testing and feedback processes are expensive and are often not seen as a priority when budgets are tight. As discussed above, there is a market for accessible products for people with disabilities. This market needs to be emphasized to the industry to encourage corporate expenditure into designing accessible products. Cost can also be a barrier to consumers. Although consumers with disabilities may be entitled to reimbursements for equipment they purchase, the reimbursement process is often difficult and complicated. Consumers may not even be aware that they have the option to be reimbursed at all. Cost is also a factor in initiating and maintaining services such as wireless local area networks (WiFi) or wireless metro area networks (WiMAX). Because wireless networks are a service, rather than a product, customers have to continue paying fees to use this technology. Recommendation:

These services could be made more affordable by providing a scale of services. A number of other ways exist to make these services more affordable to users. Treating WiMAX as a public utility would make the service available to everyone, not just consumers with disabilities, at a lower cost.

#### ***5.2.1.5 Accessibility: Challenges***

As current products evolve, accessibility is a consideration in their design. Accessibility concerns become more critical as a completely new technology is being developed or a new service is being deployed. Accessibility is an important topic, but it presents a problem without a simple solution. Universal design is a good approach when designing products, but will not be able to satisfy all markets. As discussed in the next section, interoperability with other products complicates the problem further. Provision of services also presents significant accessibility challenges. Access to emergency personnel is imperative in ensuring a high quality of public safety. As telecommunications technology advances, it is important that emergency services utilize the technology to provide better service without negotiating the ability of people with disabilities to use the new systems.

#### ***5.2.1.6 Standards and Interoperability: Challenges***

As awareness of disability issues and advancement of telecommunications technologies both increase, standards play an increasingly important role in product development and deployment. Government regulations are important to ensure that products are designed with accessible features. From an industry perspective, however, standards can often impede the ability to deploy new products that may or may not benefit people with disabilities at a quicker pace. Interoperability between wireless devices and other assistive technology is another important area where standards play a critical role. Hearing aid compatibility and interference of non-communication devices with wireless technology continues to be a problem. Recommendations: (1) Wireless technology needs to be developed in such a way that it does not interfere with other assistive technologies that people with disabilities need to function in mainstream society. (2) Standards are necessary to ensure that all devices are compatible. Although they may be viewed critically from an industry perspective, the standards should be further developed to cover all areas where interference could occur.

#### ***5.2.1.7 Reliability***

For emergency communications, reliability goes hand-in-hand with accessibility. To ensure access to emergency services whenever necessary, the technology needs to work at all times. Reliability is also a major issue with the current wireless networks. Recommendation: Provide a scaleable wireless network is one way to solve the problem. If a consumer desires a more reliable service, he or she can pay more to receive it. Or it can be approached from the other direction; wireless networks are unreliable, so plan to use it according to its capabilities.

### **5.2.2 Summary of Roundtable Discussions**

Several trends appeared during the roundtable discussions at the conference, and the overlap of key issues is significant. Awareness and education, both of the industry and of consumers, appeared as key issues in six of the nine sessions. Design factors appeared in four of the sessions. Market factors, costs/affordability, and accessibility concerns each appeared as key

issues in three of the sessions. Concerns centered on interoperability/standards and reliability appeared in two of the sessions.

### 5.3 Policy Delphi

A new initiative of the policy arm of the Wireless RERC is to undertake a Policy Delphi study. The study has been designed and will be the first of its kind implemented for on-line use in cooperation with the National Science Foundation (NSF) funded Human-Environment Regional Observatory (HERO) project hosted at Pennsylvania State University.<sup>31</sup> Equal access to wireless technology related services and devices can be addressed to some extent, by legislation and regulations. In other instances, new initiatives in disability and telecommunications policy and research can support increased access to wireless technologies that address the needs of the disability community and foster among all stakeholders a better awareness of their needs. Development of the most effective tools and approaches is dependent upon a broad stream of input from a wide array of stakeholders. To this end, the Wireless RERC is conducting a Policy Delphi<sup>32</sup> poll using an online format. The poll is designed to probe key stakeholder's opinions of what constitute the most significant issues for the adoption and use of wireless technologies by individuals with disabilities. It will be used to assess the status of policies and technologies affecting use of wireless communications technologies by people with disabilities, and to develop a framework and process for initiating policies, rules and regulations that support increased access. Finally the results will be used to help develop policy approaches for reducing barriers to the use of wireless technologies with the goal of enhancing opportunities for increased independence for people with disabilities.

Ultimately, the specific objective is to develop strategies and recommendations for policymakers and regulators to aid and improve mobile wireless technology applications in support of employment, independent living, and the community integration of people with disabilities.

## 6.0 CONCLUSION

Wireless information and communications technologies offer individuals the means to lead a more independent, knowledgeable and convenient lifestyle, unfettered by physical locale, making information readily available regardless of location or time. The resources and capabilities of research and other organizations can be leveraged to facilitate research, business

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<sup>31</sup> e-Delphi system [<http://hero.geog.psu.edu/index.jsp>]

<sup>32</sup> A Policy Delphi goes beyond the limitations of conventional Delphi with an interest in creating new procedures that more closely match the complexities of the policy problem. The policy Delphi method uses some of the same principles as the conventional Delphi, but introduces several new ones including the use of informed advocates or key stakeholders, rather than policy issue 'experts.' (Dunn, 1994). The goals of the multistage policy Delphi method are to describe a variety of alternatives to a policy issue(s) and to provide a constructive forum in which consensus may occur. The conventional Delphi method is a systematic, judgmental forecasting procedure used to obtain, exchange, and develop informed opinion about a particular topic, or future events, and is well suited for complex problems for which policy alternatives are not well defined and for which theories or empirical data are not available to make a forecast (Dunn, 1994). [Dunn, William N. (1994). *Public policy analysis: An introduction* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.]

and academic collaboration. Marketing the capabilities and benefits of assistive wireless technologies has always presented problems for both producers and users alike. With a larger potential market base, assistive telecommunications technologies would enjoy the benefits associated with a competitive marketplace – thereby offering improved technologies at affordable prices. Increased investment in product research and development may help address problems of technology incompatibility. Larger markets for these technologies provide incentives to development of new products.

The challenges faced in the European Union and the United States similarly impact the ability of *all* countries to stimulate innovations, develop meaningful universal design approaches, take advantage of assistive technologies, develop opportunities in unlicensed spectrum<sup>33</sup>, create policy planning across borders and countries, and train a new generation of design engineers, policy makers and end users. Future opportunities to work together will serve as a bridge for users and policymakers to discuss with manufacturers the achievement of common goals of accessibility to enhance participation of persons with disabilities.

A rigorous platform, encompassing face-to-face discussions on the leveraging of mutually beneficial initiatives to advance developmental U.S. and European Union work must be added to the international agenda. Best practices on the efforts to move research from promising concepts to implementation of useable devices might be compared and adapted to be applicable to both the U.S. and European Union. Bringing together area experts to share results from policy strategies, and research, and development efforts will yield more innovative projects and advance international efforts to develop mobile wireless technology applications that increase independence, employment and quality of life for many persons with disabilities.

Discussions exploring international policy issues provide the opportunity to develop fresh lenses of analysis combining the different disciplinary perspectives of the participants. Identification of the key policy issues such as those presented above may vary by locale and can be expected to be culturally and socially dependent. Still, examining broad policy approaches designed in different settings can yield innovative synergistic initiatives to help achieve fully accessible living for all. Working groups can investigate specific policy and regulatory interventions that can for instance explore use of market mechanisms, voluntary standards groups to deliver new products, and increase outreach/awareness efforts using Internet and other ICT-centric technologies. Collaboration can then harvest the best ideas, solutions and innovations from the respective international partners.

Countries working in independent silos can not solve far reaching issues of inclusion of all our citizens. Conversely, international collaborations will reduce redundancy, increase efficiency, identify mutual challenges, and lead to enriched relationships among the engineering, research, development and disability communities on both sides of the Atlantic. Finally, as technology and engineering innovations do not occur in a vacuum, increased emphasis needs to be placed on research efforts exploring the opportunities as well as barriers that domestic and

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<sup>33</sup> International bodies such as the International Telecommunications Union often use the term short range devices because the term “unlicensed” is often confusing in an international context.

international policy offers to the development and deployment of new wireless technologies and services.

A policy agenda placing an emphasis on collaborations, domestically and internationally, and supporting initiatives to develop new applications of telecommunications technologies can offer new opportunities for people with disabilities, and reduce barriers existing in day-to-day living. The critical contribution of wireless technologies toward improving the quality of life not only for persons with disabilities, but also for all members of society underscores the importance of transatlantic wireless communications policy and research initiatives. In conclusion, sharing, collaborating and creative policymaking will further international relations and benefit not only citizens of developed nations but also improve the social welfare of citizens worldwide.

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