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**PROMOTING ACCESSIBLE INFORMATION AND
COMMUNICATIONS TECHNOLOGIES
WITH REASONABLE ADAPTATION**

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Promoting Accessible Information and Communications Technologies with Reasonable Adaptation: learning from the Manila “Declaration” and “Design Recommendations” on Accessible ICT”*

Summary

The paper reviews issues and trends in the rapidly changing field of information and communications technologies (ICT) from the perspective of accessibility with reasonable adaptation. Accessibility is identified as an essential component of the broad human rights framework and development. The United Nations Standard Rules on Equalization of Opportunities for Persons with Disabilities provide in Rule 5 that accessibility is a precondition for full participation and equality of persons with disabilities. Accessibility has emerged as an important consideration in the current process of elaborating an international convention to promote and protect the rights and dignity of persons with disabilities. The Working Group established by the Ad Hoc Committee concerned with the elaboration of the convention met at United Nations New York from 5-16 January 2004 to prepare a draft text of the convention, which includes a specific article on accessibility.

Two forces are driving accessibility concerns. One is the pace of elaborating a new international convention to promote and protect the rights and dignity of persons with disabilities, which, when adopted, is expected to include an article on “accessibility”. The second force relates to the rapid expansion in mobile communications and growing use of mobile communication devices to access Internet-enabled resources. Mobile users prefer sites that load quickly, are easy to navigate and use, and provide text equivalents for graphical content for low-bandwidth conditions – in short, accessible Web sites. Accessibility is a concern for all.

The development case for accessibility is its contribution in building a society for all; the value proposition is accessible designs provide the best possible solutions for all and not for any particular constituency.

The paper identifies six decision points in an accessibility with reasonable adaptation agenda, which provide a framework for research, development, testing and evaluation of pilot action for national capacity building and training of trainers in accessible ICT: (1) Policy framework for ICT accessibility with reasonable adaptation, (2) Assessing user needs and preferences, (3) Standards and guidelines for planning and design, (4) Selected procedures and tools, (5) Monitoring and evaluation of content and service accessibility, and (6) Promotion, information and outreach. It also presents a strategic planning outline to further an accessible ICT agenda.

The paper concludes by noting that accessibility is always “under construction” given the rapid pace of change in the ICT field and the changing needs, preferences and capacities of end users.

I. INTRODUCTION

This paper reviews international policies, structures and technologies related to accessible information and communications technologies (ICT), with special emphasis on Internet accessibility.

It is concerned with a single issue: ICT accessibility with reasonable adaptation and its role in furthering full participation and equality of persons with disabilities in social life and development.

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Information and communications technologies are recognized components of the “new” economics of development; their social and economic implications are subjects of studies and papers. The rapid expansion of information goods and services provides countries with catalysts for change and for re-engineering. Less well-documented, however, is the question of accessibility in information and communications goods and services and its implications for inclusive and participatory development for all.

Information and communications technologies have been discussed in many intergovernmental meetings. The “Ministerial Declaration” adopted by the High-level segment of the substantive session of the 2000 Economic and Social Council identified ICT as essential in the “development of the global knowledge-based economy”.¹ The “Declaration of Principles” adopted at the First phase of the World Summit of the Information Society (WSIS) (Geneva, 10-12 December 2003) noted the “potential of information and communication technology to promote the development goals of the Millennium Declaration”.² Both documents consider the issue of access to ICT and the development of countries, but neither addresses the question of ICT accessibility.

ICT accessibility refers to way in which ICT respond to the needs, preferences and abilities of users. ICT designs and provisions as well as social, economic and institutional conditions can present barriers to participation by the many in the potential of ICT to inform, empower and engage in social life and development.

Accessible information goods and services have been considered in deliberations of the Ad Hoc Committee of the United Nations General Assembly that is considering a comprehensive and integral convention on protection and promotion of on the rights and dignity of persons with disabilities.³

The premise of the paper is accessible ICT is part of the broad human rights framework and development and precondition for furthering a “society for all”.⁴

The paper takes as its point of departure the “Manila Declaration on Accessible ICT” and the companion “Manila Accessible ICT Design Recommendations” produced by the United Nations Interregional Seminar and Regional Demonstration Workshop on Accessible ICT, which was hosted by the Government of the Republic of the Philippines, represented by its Department of Social Welfare and Development and the National Council on the Welfare of Persons with Disabilities at Manila from 3 to 7 March 2003.⁵ The Manila Declaration and Design Recommendations are products of technical exchanges among policy makers, academics and ICT professionals from many countries. The documents provide guidance on promoting and achieving ICT accessibility for all. They build upon the normative guidance provided in Rule 5 – Accessibility – of the United Nations Standard Rules on Equalization of Opportunities for Persons with Disabilities:

“States should recognize the overall importance of accessibility in the process of the equalization of opportunities in all spheres of society. For persons with disabilities of any kind, States should (a) introduce programmes of action to make the physical environment accessible; and (b) undertake measures to provide access to information and communication.”⁶

Participants in the Manila seminar and workshop noted that while accessibility is increasingly recognized as an essential component of rights based approaches to development, the topic required further strengthening and policy development, particularly in connection with the process of elaborating a new international convention to promote and protect the rights and dignity of persons with disabilities. They further noted that progress in implementing the Manila “Declaration” and “Design Recommendations” will require action both to create awareness that accessible ICT benefits all - particularly as this relates to development of the knowledge-based global economy of the twenty-first century – and to strengthen national capacities for design, development, implementation, monitoring and evaluation of accessible information and communications technologies, goods and services. Capacity building was identified as the urgent task if the many were to realize the benefits of information and communications technologies in the New Millennium.

From the macro policy perspective, ICT access and accessibility with reasonable adaptation is best examined in the context of comprehensive development agenda, which include decisions on investments in people, in

terms of health, education and social services, in infrastructure related to the productive sectors, and in the development of institutions of society that are open, representative and participatory. While macro development policy is beyond the scope of this paper, they represent essential components in the evaluation of strategies, policies and programmes aimed at realizing the development goals of the Millennium Declaration and which, to date, have not addressed the role of accessibility in furthering those eight global development goals.⁷

The focus of the paper is on *accessibility with reasonable adaptation*, which is in contrast to the term “reasonable accommodation” used in General Assembly resolution 57/229 on further work on elaboration of an international convention to promote and protect the rights and dignity of persons with disabilities. The term “reasonable adaptation” reinforces the view that accessibility benefits all and is not the concern mainly of persons with special abilities – or older persons. Experience suggests that accessibility with reasonable accommodation can often result in the development of separate but unequal information and communications goods and services. For instance use of “Text only” pages on Internet sites to accommodate users of assistive devices rarely provide the same Internet-enabled information experience as do resources with graphical content; nor are “text only” resources updated as frequently as are those with graphical content. Reasonable adaptation aims to introduce accessibility considerations at the outset of the design and development of Internet-enabled resources, for instance the “Low graphics version” news site of the British Broadcasting Corporation <http://news.bbc.co.uk/text_only.stm> provides the same content and updates as its “Graphics version”.

The paper is in two parts. The first section reviews briefly accessibility policies and issues; the second outlines a strategic framework to build national capacities for accessibility with reasonable adaptation. The paper includes as annexes the Manila “Declaration” and “Design Recommendations”, selected resources on accessible ICT, and a review of pilot action to promote accessible Internet-enabled resources at the United Nations.

II. ICT ACCESSIBILITY: ISSUES AND TRENDS

The rapid pace of change in the field of information and communications technologies is especially evident in developments with the global Internet and in personal communication devices. In less than a decade, the Internet has been transformed from a tool primarily for the exchange of research studies to a world-wide network based on open standards that supports a wide range of information goods and services, which have expand geometrically.⁸ The twenty-first century has also witnessed growing commercialization of Internet protocol-based audio and video technologies and the emergence of specialized sub-networks for file sharing – legal or otherwise - whose proprietary characteristics place limits on global connectivity and accessibility.⁹

A. The Internet

The Internet is a set of international communications networks based on open standards that define low-level communications protocols, distribution protocols, document content standards and image formats.¹⁰ In spite of its global reach and impact, there currently is no one body or institution that “governs” the Internet.¹¹ Many trans-border Internet issues remain the province of non-profit professional bodies that formulate, submit for comments and recommend technical standards, for instance the “Internet architecture” activities of the Internet Engineering Task Force <<http://www.ietf.cnri.reston.va.us/home.html>>. Another non-profit organization, the World Wide Web Consortium <<http://w3c.org>> and its Web Content Accessibility Group have published suggested standards for accessible Web design.¹²

Recent developments in ICT technologies, infrastructure and regulations are contributing to expanded data flows and information services to more people, which contribute not only to increased access but reduced complexity and cost. New ICT technologies often are characterized as disruptive to the status quo due to changes that may result in business (and governmental) structures and processes; new information goods and services oblige organizations to re-examine the ways in which they organize, carry out, monitor and evaluate their work processes and perform services. To promote greater coherence and connectivity among new information and communications technologies, Internet-enabled technologies in particularizes, a number of interested parties, including private sector organizations, have initiated joint efforts to establish

and support technical consultative bodies to address the new technologies and formulate recommended standards, in such areas as Web Services, structured information resources and interoperability.¹³

Internet governance was considered in connection with policy options related to development of a knowledge-based global economy by the High-level substantive segment of the year 2000 United Nations Economic and Social Council, whose "Ministerial Declaration" states:

"We are deeply concerned that, at present, ITC's huge potential of advancing development has not been fully captured ... urgent and concerted actions at the national, regional, and international levels are imperative for bridging the digital divide and building digital opportunities and putting ICT firmly in the service of development for all. In this regard we call upon all the members of the international community to work co-operatively to bridge the digital divide and to foster 'digital opportunity'."¹⁴

Deliberations at the First phase of WSIS directed special attention to the role of international policy in field of ICT, and its "Declarations of Principles" includes the request that the Secretary-General of the United Nations submit a report on the question to the General Assembly by 2005.¹⁵

Intergovernmental oversight of the Internet is not a new concern or activity. In connection with its "Digital Agenda"¹⁶ the World Intellectual Property Organization (WIPO) has published a number of technical reports on the Internet Domain Name process.¹⁷ The non-profit Internet Corporation for Assigned Names and Numbers <<http://www.icann.org>> is responsible for Internet Protocol (IP) address space allocation, domain name system management and root server management.¹⁸

B. Basic terms

Discussions on accessible ICT, Internet accessibility in particular, need to address three key issues:

(1) Access. The term "access" is used in the World Programme of Action concerning Disabled Persons to refer to the availability of goods or services,¹⁹ such as rehabilitation services.

Access to ICT and development is considered in the "Ministerial Declaration" of the High-level Segment of the substantive session of the year 2000 Economic and Social Council on "development and international co-operation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy:"

"Access to information and knowledge-sharing is largely determined by education, capabilities, including resources, transparent societies, capacity to generate and utilize knowledge, connectivity and the availability of diverse content and applications and the policy and legal/regulatory framework."²⁰

The "Declaration of Principles" adopted at the First phase of WSIS state:

"...that education, knowledge, information and communication are at the core of human progress, endeavour and well-being;

"...that the benefits of the information technology revolution are today unevenly distributed between the developed and developing countries and within societies."²¹

(2) Accessibility. The World Programme of Action discusses accessibility with reference to equalization of opportunities, which it defines as "the process through which the general systems of society are made accessible to all."²²

The United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities consider accessibility in both the physical and the information and communication technology environments.²³ Rule 5 – Accessibility – remains the principal source of international normative guidance. In the context of Rule 5 environmental considerations include policy, legal and administrative frameworks

related to accessibility, relative levels of development, institutional arrangements and national capacities to plan and manage accessibility with reasonable adaptation.

Environmental accessibility is discussed in several reports of the Secretary-General on progress in implementing the World Programme of Action and the Standard Rules. These presentations define accessibility with reference to designs and procedures that “accommodate the needs, preferences and special abilities of each user.”²⁴

United Nations General Assembly resolution 52/82 identified “accessibility” as the first priority in policies and programmes to further equalization of opportunities and which promotes a society for all.²⁵

Accessibility has emerged as an important consideration in the process of elaborating an international convention to promote and protect the rights and dignity of persons with disabilities. At a technical level, the “Bangkok Draft: Proposed Elements of a Comprehensive and Integral International Convention to Promote and Protect the Rights of Persons with Disabilities” defines “accessibility”:

“...the measure or condition of things and services that can readily be reached or used by people including those with disabilities, which could be achieved, through inclusive and universal design or adaptation and by legal and programmatic means, in order to promote their access to the physical environment, public transportation and information and communication, including information, communication and assistive technologies, and to societal structures and decision- and policy-making processes”.²⁶

The Working Group established by the Ad Hoc Committee to prepare a draft text of an international convention, which met at United Nations New York from 5-16 January 2004, formulated an article on accessibility:

“Draft Article 19 - ACCESSIBILITY

“1. States Parties to this Convention shall take appropriate [66] measures to identify and eliminate obstacles, and to ensure accessibility for persons with disabilities to the built [67] environment, to transportation, to information and communications, including information and communications technologies, and to other services, [68] in order to ensure the capacity of persons with disabilities to live independently and to participate fully in all aspects of life. The focus of these measures shall include, inter alia:

- a. the construction and renovation of public [69] buildings, roads and other facilities for public use, including schools, housing, medical facilities, in-door and out-door facilities and publicly owned workplaces;
- b. the development and remodelling of public transportation facilities, communications and other services, including electronic services.

“2. States Parties shall also take appropriate measures to:

- a. provide in public buildings and facilities signage in Braille and easy to read and understand forms;
- b. provide other forms of live assistance [70] and intermediaries, [71] including guides, readers and sign language interpreters, to facilitate accessibility to public buildings and facilities;
- c. develop, promulgate and monitor implementation of minimum national standards and guidelines for the accessibility of public facilities and services;
- d. encourage private entities that provide public facilities and services to take into account all aspects of accessibility for persons with disabilities;
- e. undertake and promote research, development and production of new assistive technologies, giving priority to affordably priced technologies;
- f. promote universal design and international cooperation in the development of standards, guidelines and assistive technologies;
- g. ensure organisations of persons with disabilities are consulted when standards and guidelines for accessibility are being developed;
- h. provide training for all stakeholders on accessibility issues facing persons with disabilities.

“Footnotes:

“[66]: Some members of the Working Group preferred the word "progressive" in this paragraph and in the chapeau of paragraph 2. Other members were concerned with consistency with other articles of the Convention. The Ad Hoc Committee may wish to consider alternative formulations.

“[67]: The Ad Hoc Committee may wish to consider whether the term "physical" should be used instead of "built", which is its near synonym in this context.

“[68]: The Ad Hoc Committee may wish to consider further the issue of attempting to list comprehensively the facilities and services covered in the chapeau to this paragraph, including whether a reference to the "communications environment" is desirable.

“[69]: The Ad Hoc Committee may wish to consider the scope of the provisions in this draft article, in particular paragraphs 1(a) and (b), and 2(a), (b), (c) and (d). The Working Group questioned whether the concept of public buildings, facilities and services should also extend to privately owned or developed buildings, facilities and services intended for public use, and what level of obligation States Parties should place on private owners or developers to ensure access to persons with disabilities. Some members of the Working Group were of the view that privately owned or developed buildings, facilities and services should be covered by the obligations in this draft Article, but other members wished to consider the implications of this further.

“[70]: 'Live assistance' includes human assistance, such as guides and readers, and animal assistance, such as guide dogs. The Ad Hoc Committee may wish to consider whether there is a more self-explanatory term. The term is also used in draft Article 20(a) [Personal Mobility].

“[71]: 'Intermediaries' means people who do not assist but who rather act as a conduit for the transmission of information to certain groups of persons with disabilities, for example, sign language interpreters for the hearing impaired. The term is also used in draft Article 20(a) [Personal Mobility].”²⁷

(3) Reasonable adaptation. General Assembly resolution 57/229 (on further elaboration of the international convention) calls for accessibility with reasonable accommodation to United Nations facilities and documents. Reasonable in this sense refers to a minimum set of provisions to further accessibility with regard to the process of elaborating the convention.

In terms of national law, the “Americans with Disabilities Act” states “reasonable accommodation” may include:

“(a) making existing facilities used by employees readily accessible to and usable by individuals with disabilities; and

“(b) job restructuring, part-time or modified work schedules, reassignment to a vacant position, acquisition or modification of equipment or devices, appropriate adjustment or modifications of examinations, training materials or policies, the provision of qualified readers or interpreters, and other similar accommodations for individuals with disabilities.”²⁸

For purposes of policy design and evaluation “accommodation” refers to provision of conditions that respond to a need or want that permit adaptation or adjustment to particular circumstances or environments. For persons with disabilities, accommodation would place them on an equal footing with non-disabled persons. The accommodation needed would depend on the disability, the economic or social sector, the environment and relative levels of development.

While the term “reasonable” accommodation is used a number of policies, legal and administrative settings, there is growing concern that environmental accessibility is best achieved by policies and technical standards based on “reasonable adaptation”. Adaptation is consistent with the concept and principles of universal design and the need to introduce accessibility considerations at the outset of the analysis, design, planning and development of services and facilities so that they provide accessibility for all and not in terms of additional requirements of population groups with special needs or abilities.

The concept “reasonable” is more complex and raises the question "reasonable for whom?" This introduces two considerations. The first is that what level of accommodation is fair for all members of society, which is

an issue of equity. The second is what is reasonable in terms of resources available to a society, especially public resources, which is an issue of feasibility.²⁹

C. Policy framework

A growing number of countries, and states and provinces in countries with federal systems of government, are drafting and adopting policies, legislation and administrative guidance on accessibility to information and telecommunications services. However, the international policy basis for accessibility remains the 1993 United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities (General Assembly resolution 48/96, annex). As discussed in the preceding section, Rule 5 of the Rules addresses “Accessibility” in both the physical environment and with regard to information and telecommunications services.

While the role of information and communications technologies in the global knowledge-based economy was considered at the year 2000 High level segment of the Economic and Social Council, the Ministerial outcome document did not address the role of accessible ICT in promoting opportunities for all to participate as agents and beneficiaries of development of knowledge-based economies.

The “Declaration of Principles” adopted at the First phase of WSIS does not consider accessibility and addresses the situation persons with disabilities in connection with “marginalized and vulnerable group of society:

“In building the Information Society, we shall pay particular attention to the special needs of marginalized and vulnerable groups of society, including migrants, internally displaced persons and refugees, unemployed and underprivileged people, minorities and nomadic people. We shall also recognize the special needs of older persons and persons with disabilities.”³⁰

The “Manila Declaration on Accessible Information and Communications Technologies (ICT) was formulated by participants at the United Nations Interregional Seminar and Regional Demonstration Workshop on Accessible ICT and Persons with Disabilities (Manila, 3-7 March 2003) to provide interested governments with policy-related options and technical guidance on promoting accessible ICT in the context of national development. The “Manila Declaration” builds upon the policy guidance of Rule 5 – Accessibility - of the Standard Rules and two key international human rights treaties - the *International Covenant on Civil and Political Rights* and the *International Covenant on Social, Economic and Cultural Rights* – in order to link accessibility with the broad human rights framework and development::

“Access to the physical environment and access to information and communications impact the full scope of social life and development for all and can promote equality and opportunities for full participation for everyone.”³¹

While noting the empowering and enabling capacities of accessible ICT to further full participation and equality of persons with disabilities in social life and development, the “Manila Declaration” adds that accessible ICT involves the larger set of electronic and information technology products, equipment systems and services that store, process, transmit, convert, duplicate or receive digital information, which include photocopiers, computers, personal digital assistants (PDAs), facsimile machines, information transaction machines or kiosks, automatic transaction machines (ATMs), voting machines, operating systems, software (including application generators and development tools), Web sites, public mass media (radio, television and cinema) and telecommunications systems and devices. As a general consideration, the “Declaration” states:

“...electronic and information technology products and services should provide accessibility with reasonable accommodation”.³²

Guidance on the design, development and evaluation of accessible ICT designs and resources is presented in the “Manila Design Recommendations on Accessible Information and Communications Technologies (ICT).³³ The “Manila Design Recommendations” build on universal design concepts and principles, in

particular the principle that designs meet the needs of diverse users through inclusive solutions and open and democratic participation.

The "Design Recommendations" provide a critical minimum threshold for accessible ICT in countries. They were formulated on the premise that ICT accessibility does not present an undue burden; it is easily realized through application of "first principles": (1) provide text alternatives for visual elements and graphical images; and (2) separate issues of document content and structure from document layout, which will aid users of assistive devices.³⁴

The "Design Recommendations" provide a seven-point check list for design, development and evaluation of Internet-based content that will provide flexibility in accommodating each user's needs and preferences:

1. Provide an Access Instruction page for visitors (explaining the accessibility features of the Web site and providing an e-mail hyperlink for visitors to communicate problems with Web page accessibility);
2. Provide support for text browsers and descriptive hyperlinks (links such as "this" and "click here" do not alone convey the nature of the target link);
3. Attach ALT<alt> (alternative) text to graphic images so that assistive computer technology such as screen readers can reach the content;
4. For each photograph which contributes meaningful content to the page, provide a "D" hyperlink to a page providing descriptive text of the image;
5. Provide text transcriptions or descriptions for all audio and video clips;
6. Provide alternative mechanisms for online forms since forms are not supported by all browsers (such as e-mail or voice/TTY phone numbers);
7. Avoid access barriers, such as the posting of documents in Adobe® PDF (Portable Document Format), non-linear format, Frame format or requiring visitors to download software to access the content. If posting in Adobe® PDF, accessible HTML (Hypertext Markup Language) or ASCII text must also be posted by the Web master converting the document.³⁵

III. STRATEGIC FRAMEWORK FOR CAPACITY BUILDING FOR ACCESSIBILITY WITH REASONABLE ADAPTATION

A. Demand and supply considerations

Traditionally, the focus in the development of training and resource materials on accessible ICT has been users with special needs, with those who produce content appropriate to end users with special needs as well as those who may have limited information and communications technologies infrastructure. However, the "Manila Declaration" directed special emphasis not only to the instrumental and empowerment capacities of ICT in furthering equalization of opportunities for persons with disabilities but to accessible ICT a part of the broad human rights framework and development. Accessibility is a concern for everyone. The rapidly growth in users of mobile communication devices – telephones as well as personal digital assistants (PDAs) - has created a new constituency for accessible ICT and ease of access to mobility-enabled information goods and services.

Participation on the basis of equality requires accessible information and communications technologies, since technologies that may create barriers for some will limit opportunities for many to participate in civil and political life and engage in social, economic and cultural activities that are essential for the realization of improved well being and livelihoods for all.

Thus, the demand for training and resource materials on accessible ICT goes beyond the traditional estimate of 600 million persons with disabilities and would include ICT policy makers, professionals, academics and producers and consumers of information goods and services – public and private.

The capacity building framework aims to promote awareness and present options to strengthen knowledge of principles and concepts of ICT accessibility with reasonable adaptation for all, with special attention directed to Internet accessibility. The framework is event driven, given the rapid pace of change in the ICT

field. To cite but one example: the increased use of digital content in both the production and transmission of television services and the cinema. These developments have important implications for development of accessibility metrics – as well as security protocols - to facilitate the shift from analogue to digital services.

The decided emphasis in capacity building is to provide knowledge and skill that will result in the progressive removal of handicapping conditions for persons with disabilities in recognition of accessibility as a basic human right.. The framework includes a review of policy options to promote accessibility, procedures and standards on accessible ICT, and approaches to advocacy, monitoring and self-evaluation. The presentation draws on pilot materials prepared, tested and evaluated in connection with United Nations seminars and workshops on training of trainers for Internet accessibility and persons with disabilities.³⁶

A further consideration for capacity building is that the ICT field is characterized by equally rapid changes in institutional arrangements, which include privatization of telecommunications services and public and private sector cooperation in the formulation, testing and evaluation, and submission of recommendations for standards and protocols. Experience suggests that rapid prototyping of materials, systematic testing and evaluation are essential components of effective and sustainable capacity building, which also requires open and democratic networks of excellence for ideas, feedback and exchanges of knowledge and experience as well as to identify and undertake joint projects and establish alliances to support of accessible ICT objectives.

The strategic framework for accessible ICT is based on six decision points related to analysis, planning, development, monitoring and evaluation of ICT accessibility with reasonable adaptation, with special attention directed to accessible Internet-enabled content and services. Concluding remarks focus on reinforcing the training experience.

1. Policy framework for ICT accessibility with reasonable adaptation;
2. Assessing user needs and preferences;
3. Standards and guidelines for planning and design;
4. Selected procedures and tools;
5. Monitoring and evaluation of content and service accessibility;
6. Promotion, information and outreach.

B. ICT accessibility policy considerations

Policy considerations are important since the underlying technology of the Internet presents no obstacles to accessibility. Obstacles are built into particular applications and uses, which are growing at an exponential rate. A number of key policy issues are currently being debated in countries and in international *fora*, which include universal services, domain names, intellectual property and Internet governance.³⁷ An exchange on policy considerations should result in identification of a policy framework on accessibility with reasonable adaptation.

The principle source of international policy guidance on accessible ICT is Rule 5 – Accessibility – of the Standard Rules. Pilot training workshops and seminars organized in support of the United Nations global programme on disability include a specific session on the Standard Rules to reinforce their role in the design and evaluation of disability-sensitive policies, strategies and programmes.³⁸

With the introduction of draft text on an “accessibility” article in the new international convention to promote and protect the rights and dignity of persons with disabilities, training activities will need to address issues of promoting awareness of the proposed article and measures to further its implementation once the draft convention is adopted by the United Nations General Assembly and ratified by governments. Further considerations include approaches to monitoring and evaluation of compliance with the accessibility article and reporting mechanisms on progress in implementing the convention by States parties.

A third issue in training of trainers is the need to link relevant national law and administrative guidance with international norms and appropriate standards on accessibility. Some governments and the European Union have opted into the accessibility guidance presented in the Web Content Accessibility Initiative of the World Wide Web Consortium, a private, non-profit organization. While other governments have formulated

accessibility guidance based on national legislation, such as Section 508 of the Rehabilitation Act of the United States, which presents accessibility standards for electronic and information technologies.³⁹

The "Manila Declaration" and its associated "Design Recommendations" represent an attempt to provide a critical minimum threshold for accessible ICT designs, products and services, which build upon relevant international norms and standards and selected national experience and technical standards.

One lesson of the Manila experience is that there is no one policy solution to accessible ICT in the light of the rapid pace of change and the growing number of users who require flexibility in making full use of mobile services and better to exploit the convergence in digital audio and video services.

Opting in to any one set of standards or adoption of a particular set of national law and administrative regulations means that external bodies deal with ongoing accessibility research, testing and evaluation of new technologies, document and disseminate findings and submit recommendations. However, opting into a particular accessibility regime can present constraints on national ICT infrastructure, public and private, since external standards presuppose an assumed level of institutional and technical capacity. ICT developers, providers of services and regulatory bodies may therefore need to approach accessibility as an added cost rather than integral component in their estimates to design, build, operate and maintain ICT goods and services.

The Manila outcome documents are based upon agreed international norms, are consistent with deliberations on accessibility in the Ad Hoc Committee and provide a critical minimum of technical guidance to design and produce accessibility with reasonable adaptation for all.

The Manila outcome documents do not address the question of Internet governance but draw upon material developed in connection with pilot training on "International Information Structures and Technologies: the social perspective"⁴⁰ presented at United Nations headquarters in the late 1990s, shortly after Internet access was provided all staff members. In this presentation it was noted that no one body "controlled the Internet", that it was a set of global networks based on open standards; it was argued that the global Internet represented the "ultimate global commons"⁴¹ where no one part can function well without all other parts operating well, and from this perspective, some form of overall governance was essential. The presentation further noted that any framework for Internet governance would need to be based on agreements by governments but that it must also bring on board the many Internet constituencies – private sector, technical bodies and societies, non-governmental organizations and civil society - that currently exist or can be forecast with reasonable expectation which without a whole, there will be no parts.⁴²

The question of Internet governance has been identified as an important topic in preparations for the Second phase WSIS, scheduled for Tunis in 2005⁴³ and the Secretary-General of the United Nations has been requested to convene a Working Group that will (1) develop a working definition of Internet governance; (2) identify public policy issues that are relevant to Internet governance; (3) develop a common understanding of the respective roles and responsibilities of governments, existing intergovernmental and international organizations and other forums as well as the private sector and civil society from both developing and developed countries; (4) prepare a report on the results of this activity to be presented for consideration and appropriate action for the Second phase of WSIS to be held at Tunis in 2005. The outcome of the WSIS-related Working Group on Internet Governance together with the results of the deliberations of the Ad Hoc Committee on the new international convention to promote and protect the rights and dignity of persons with disabilities will influence further developments in Internet policy analysis and evaluations resource and training materials.⁴⁴

While beyond the scope of the current discussion on accessible ICT policy options, two other issues increasingly are part of Internet policy dialogue: (1) security and privacy and (2) copyright and fair use.

1. Security and privacy issues are associated with the fact that the Internet is Internet is a global network of computers, based on open standards, which share and exchange information. The ease of communications over the global Internet introduces possibilities of unauthorized use, theft or tampering with personal or organizational – public and private – information.⁴⁵ From a technical standpoint, security is

important both to the integrity of the global Internet and the safe and confidential exchange of personal or organizational information. From a policy perspective, Internet security and privacy issues need to be addressed at the level of national law and administrative guidance; and a growing number of countries have enacted legislation on Internet-related crime.⁴⁶ Policy studies on global trends in Internet-related crime as well as technical cooperation in the field are provided by the United Nations Centre for Crime Prevention and Criminal Justice.⁴⁷ From an organizational perspective, security policies build upon relevant national law and outline risk and acceptable use, which are separate from procedural and technology issues, such as operating system maintenance, intrusion detection and data encryption.

2. Copyright and fair use issues are associated with the ease with which intellectual property can be translated into a digital resource, published on the Internet and shared widely. This is said to contribute to the global body of knowledge and promote creativity; others contend that unauthorized use of materials under copyright is theft. A number of these issues are developed in a new book by the legal scholar, Professor Lawrence Lessig - *Free Culture* (Penguin Press, 2004)⁴⁸ in which he argues that intellectual property is an instrument that sets the groundwork for a creative society; while intellectual property law is to support the value of creativity, he is of the view that large corporations are using the law to lock up creativity for their own purposes. In addition to the free software movement,⁴⁹ characterized notably by the Linux community, some scholars, including Professor Lessig, are advocating a "middle approach" for greater sharing of intellectual property while providing appropriate attribution to those who create the intellectual property through a "Creative Commons License" <<http://creativecommons.org/licenses/by/1.0/>>.

C. Assessing user needs and preferences

Accessible Internet-enabled resources and services require both an analysis of user needs, interests and capacities, and planning and testing of content. Issues to be considered in the analysis of user needs and content planning include determination of objectives, planning and testing of content, including content maintenance, publicizing the site, and monitoring and evaluation of the effects of the content development effort.⁵⁰

Accessible Internet-enabled content also introduces aesthetic and usability considerations.⁵¹ Web sites can easily meet technical accessibility criteria. However, if their design proves to be to navigate, uses colors that do not enhance the viewing experience or does not provide an enjoyable or comprehensible visit, such accessible Web sites do not further the equitable ICT access and use objective.

Accessible site design must also include sustainability considerations, which are based on both an assessments of user needs, periodic content management and evaluation of the continued accessibility of content.⁵²

In the planning for a pilot project on Internet accessibility for the Division for Social Policy and Development of the United Nations Secretariat, the assessment of corporate user needs was a somewhat more complex process, which began with (1) identification of target audiences for content provided by the Division in terms of segments, preferences and interests, (2) analysis of the messages to be delivered, in terms of key issues and core competencies of the Division, (3) review of institutional identity attributes, in terms of positioning among other United Nations Secretariat Units and desired image to present to its constituencies, (4) the value added of the Division Web site and (5) outline of a linking strategy to promote awareness of the new content.⁵³

For training purposes the most effective approach to develop a user needs assessment and content planning and evaluation skills is through rapid prototyping of an individual – or small-group - Web page, as presented below:

Accessibility planning worksheet: an exercise for producers of accessible Internet content⁵⁴

1. State the purpose and objective you are pursuing;
2. Define your target audience;
3. Define the information needs of target audience that you intend to meet;

4. Describe the main technological and disability characteristics of the target audience;
5. Describe your main area of expertise in comparative advantage terms;
6. Describe in general terms the data sets you intend to provide;
7. Describe the main intended results of the data sets;
8. Describe how you plan to schedule updates of the information;
9. Describe the type of site you think would be most appropriate, given the kinds of information you want to present, the target audience and your resources (financial and technical);
10. Describe your strategy for publicizing the site; and
11. Describe briefly how you think you will monitor and evaluate your site.

D. Accessibility standards and guidelines for planning and design

One of the principal sources in the production of accessibility standards and guidelines is the Web Content Accessibility Initiative (WCAG) of the World Wide Web Consortium (W3C).⁵⁵

The Web Content Accessibility Guidelines, WCAG 1.0,⁵⁶ were first published in 1999 by W3C, a private non-profit organization, as recommended design principles for creating accessible Web content. The current draft of the Guidelines, WCAG 2.0, provides a comprehensive and extensive presentation of concepts that apply to all Web-based content and with reference to an expanded set of information devices. Their design principles are not specific to HTML,⁵⁷ XML,⁵⁸ or any other technology, so W3C is of the view that they can be applied to a variety of situations and technologies, including those that do not yet exist.

WCAG 2.0 (working draft) presents non-technology-specific guidelines, success criteria (normative) and definitions, benefits and examples (non-normative) for each guideline, and an appendix containing definitions, references and other support information. The WCAG 2.0 (draft) is based on four design principles:

1. Content must be perceivable;
2. Interface elements in the content must be operable;
3. Content and controls must be understandable;
4. Content must be robust enough to work with current and future technologies.

Since WCAG 2.0 is a "working draft", W3C has not yet published a technical checklist on its application in the design of accessible Web content; its current checklist is based on WCAG 1.0.⁵⁹

A number of governments and the European Commission⁶⁰ have adopted WCAG 1.0 as the basis for national law on Web accessibility.

Another frequently cited accessibility standard is Section 508 of the Rehabilitation Act (amended) of 1998 of the United States.⁶¹ Section 508 requires that United States Federal agencies provide people with disabilities with access to their electronic and information technologies that are comparable to access available to others. Section 508 was enacted to eliminate barriers in information technology, to make available new opportunities for people with disabilities, and to encourage development of technologies that will help achieve these goals.

Section 508 includes technical standards and performance-based requirements related to various technologies, which include:

1. Software applications and operating systems;
2. Web-based information or applications;
3. Telecommunication products;
4. Video and multimedia products;
5. Self contained, closed products (e.g., information kiosks, calculators, and fax machines);
6. Desktop and portable computers.⁶²

To implement the Section 508 standards for accessible Web content,⁶³ an online course to train Web developers in concepts and techniques of Accessible Web site design was developed by Dr. Jim Thatcher⁶⁴ (a developer of the “accessibility guidelines” of the IBM Corporation⁶⁵) and the Information Technology and Technical Assistance Training Center (ITTATC) of the Georgia Institute of Technology (USA) <<http://www.ittatc.org/>>. The course is in 12 sections <<http://www.ittatc.org/training/webcourse/>>:

1. Web Accessibility for Section 508
2. Alternative Content for Graphics
3. Checking Your Web Pages for Accessibility
4. Accessible Navigation
5. Image Maps
6. Audio and Multimedia
7. Special Cases
8. Accessible Forms
9. Accessible Tables
10. Scripts and Applets
11. Cascading Style Sheets
12. Review of Section 508 Standards for Web Accessibility

A third resource for accessible Web design, development and evaluation is the “Manila Accessible ICT Design Recommendations”⁶⁶ which are an outcome of the United Nations Interregional Seminar and Regional Demonstration Workshop on Accessible ICT and Persons with Disabilities, Manila, Philippines (3-7 March 2003).⁶⁷ The Manila Design Recommendations aim to provide countries with a critical minimum checklist for the design and development of accessible Web content.

The normative basis of the Manila Accessible ICT Design Recommendations is Rule 5 (Accessibility) of the Standard Rules.

The conceptual basis of the Manila Accessible ICT Design Recommendations is Universal Design⁶⁸ in the light of its focus on designs that meet the needs of diverse users through inclusive solutions and open and democratic participation. Accessible ICT designs based on universal concepts provide for flexibility to accommodate those who operate in low bandwidth settings, use cell phones to synthesize text and may access the Internet or use other electronic appliances by means of alternative devices.

The Manila Design Recommendations identify five considerations when designing for Web accessibility:

1. Content is organized and presented appropriate to the interests, needs and preferences of end users;
2. Aesthetics of the design accommodate the needs and preferences of diverse users;
3. Accessibility of the design benefits all users as well as users with special needs;
4. Usability⁶⁹ of the design allows users to access, navigate, search and leave the information resource easily, intuitively and without barriers;
5. Sustainability of the design is based on content management that affords flexibility to accommodate needs and preferences of diverse users.

The Manila Design Recommendations are based on the premise that accessibility is achieved easily and efficiently with the application of "first principles" of accessibility:

1. Every visual element should be implemented with a textual element that describes it. Alternative text <alt> allows for description of graphical images.
2. The structure and layout of the document should be dealt with separately. Structure is defined by HTML (Hypertext Markup Language) elements and attributes; and layout is defined by style sheets. Separation of layout from content aids text browsers to extract easily the logical structure of the document.⁷⁰

The Manila Design Recommendations identify a select set of "electronic curb cuts"⁷¹ that will provide flexibility to accommodate each user's needs and preferences and eliminate thereby possible barriers in Web-based information goods and services. Seven points are identified:

1. Provide an Access Instruction page for visitors (explaining the accessibility features of the Web site and providing an e-mail hyperlink for visitors to communicate problems with Web page accessibility);
2. Provide support for text browsers and descriptive hyperlinks (links such as "this" and "click here" do not alone convey the nature of the target link);
3. Attach ALT<alt> (alternative) text to graphic images so that assistive computer technology such as screen readers can reach the content;
4. For each photographic image which contributes meaningful content to the page, provide a "D" hyperlink to a page that provides descriptive text of the image;
5. Provide text transcriptions or descriptions for all audio and video clips;
6. Provide alternative mechanisms for online forms since forms are not supported by all browsers (such as e-mail or voice/TTY phone numbers);
7. Avoid access barriers, such as the posting of documents in Adobe® PDF (Portable Document Format), non-linear format, Frame format or requiring visitors to download software to access the content. If posting in Adobe® PDF, accessible HTML (Hypertext Markup Language) or ASCII text must also be posted by the Web master converting the document.⁷²

From a training perspective, deciding on which set of standards and guidelines to use will be influenced by the relevant national legislation. If government have decided to apply the Web Content Accessibility Guidelines (WCAG), then these are the reference training document. While WCAG is a comprehensive set of guidelines, they are the product of an opt in process, which is to say one needs to be associated with W3C or its appropriate technical committee to have an impact on the WCAG process; and application WCAG requires sites to post the W3C "Accessibility logo" to confirm the accessibility validation of the site in accordance with WCAG.

In contrast, the Manila Accessible ICT Design Recommendations are based on relevant international norms and key technical design standards. They provide a critical minimum for the design and development of accessible Web content. The "WorldEnable Validator" <<http://www.worldenable.net/wevalidator.htm>> provides an online tool that tests and provides diagnostics in accordance with the Manila Design Recommendations on accessible Web sites. Moreover, the "WorldEnable Validator" does not oblige sites to post an "accessibility logo" ex-post.

E. Selected procedures and tools

Orientation and training in accessibility procedures and tools should begin with a concise, technical review of the concepts of accessibility, Internet accessibility and Web accessibility.⁷³ Three accessibility considerations are important in this regard: accessibility of e-Mail clients, Web-based content and services, and Internet-enabled resources,⁷⁴ which should include a discussion of corporate Intranets⁷⁵, Extranets⁷⁶ and Portals.⁷⁷

The discussions should also review accessibility considerations in personal computers⁷⁸ and the role of assistive technologies,⁷⁹ particularly for users with sensorial or mobility disabilities.

A related issue is a review and discussion of online accessibility validators and related Web quality assurance tools. In this connection it is important to distinguish between online tools that examine Web pages with reference to a set of specific accessibility criteria, such as WCAG, Section 508 or the Manila Design Recommendations, and tools that assess the coherence and consistency of the content of a Web page:

"HyperText Markup Language (HTML) validators are Standard Generalized Markup Language (SGML) Parsers that check the mark-up language of a Web page against its document-type definition (DTD). A DTD for a Web page is listed before the <html> tag in the source code and

defines the type of HTML being used and the mark-up tags that can be employed within the page. HTML validators can tell users whether or not their code is valid or invalid.

“In contrast to HTML validators, accessibility tools cannot tell users whether or not their Web pages are completely accessible or inaccessible. All accessibility tools scan the source code of a Web page using interpretations of either the United States Rehabilitation Act Section 508 standards and/or the World Wide Web Consortium's Web Content Accessibility Guidelines 1.0 (WCAG). These tools help can help individuals spot glaring accessibility errors and remind users of accessibility issues that require manual checks.”⁸⁰

The W3C has produced its own online validator for WCAG <<http://validator.w3.org/>>, which checks documents like HTML and XHTML for conformance to W3C Recommendations and other standards.

Online validation of Section 508 Web accessibility compliance is available from a number of governmental and non-governmental organizations. An notable validator is CynthiaSays® <<http://www.cynthiasays.com/>>, which is a joint education and outreach initiative of the International Center for Disability Research on the Internet (ICDRI) <<http://www.icdri.org/>>, the Internet Society Disability and Special Needs Chapter <<http://www.isocdisab.org/>> and the HiSoftware Corporation <<http://www.isocdisab.org/>>. CynthiaSays® was created for the purpose of identifying errors in Web design related to Section 508 standards and WCAG guidelines and educating Web site developers about creation of Web-based content that is accessible to all.

As noted in the preceding section the WorldEnable Validator <<http://www.worldenable.net/wevalidator.htm>> assesses Web pages with reference to the accessibility considerations of the Manila Accessible ICT Design Recommendations. As with CynthiaSays® the purpose of the WorldEnable Validator is both promotional – accessible Web design is easy and does not present undue burdens on site developers – and educational – where corrections and adjustments to Web page content and structure would lead to improved accessibility for all.

Quality assurance tools address issues such as speed of page loads, use of colour and programming in HTML:

The Web Design Group HTML Validator <<http://www.htmlhelp.com/tools/validator/>> is the product of the private non-profit WDG organization, which is concerned with promoting the creation of non-browser specific, non-resolution specific, creative and informative Web sites that are accessible to all users worldwide.

Juicy Studio <<http://www.juicystudio.com/index.asp>> is a private site that aims to promote best practice for Web developers, and programmers. It has published a number of online Web quality assurance tools:

1. Readability Test - Analyses a Web page to determine how readable it is <<http://www.juicystudio.com/fog/>>;
2. Link Analyser - Tests Web pages for broken links <<http://www.juicystudio.com/services/linktest.asp>>;
3. Image Analyser - Tests Web pages to ensure that images have been specified properly <<http://www.juicystudio.com/services/image.asp>>
4. CSS Accessibility Analyser - Checks CSS [Cascading Style Sheet] files for potential accessibility issues <<http://www.juicystudio.com/services/csstest.asp>>;
5. Colour Contrast Analyser - Tests whether the contrast between background and foreground is sufficient <<http://www.juicystudio.com/services/colourcontrast.asp>>.

The Web Page Analyzer (0.82) <<http://www.websiteoptimization.com/services/analyze/>>, supported by Web Site Optimization, LLC a private-sector firm, tests Web site complexity and load speeds under several Internet access options, from dialup to high-speed Internet services.

F. Monitoring and evaluation of content and service accessibility

There are two aspects to monitoring and evaluation of content and services. The first relates to systematic monitoring and assessment of a site to ensure that new content has not resulted in a degradation of its accessibility or usability. Online accessibility validators and quality assurance tools can serve this task.

Monitoring and evaluation of content and service accessibility will be an important consideration for Web developers once the new international convention to promote and protect the rights and dignity of persons with disability comes into force in the light of its (draft) article on accessibility. States parties to the convention as well as civil society would be potential clients for an online accessibility validator based upon whatever accessibility provisions are adopted in the international convention. Since the WorldEnable Validator is based upon the Standard Rules and the International Covenants on Civil and Political Rights and on Social, Economic and Cultural Rights, it represents a logical candidate for further development in support of the convention.

A second consideration, which may only form part of specialized training activities, relates to technical monitoring of a Web site in terms of visits, operational characteristics and security matters. Most Web monitoring tools are produced by commercial software publishers, but there is a body of open source and freeware Web monitoring and site maintenance tools that can be consulted, tested and evaluated in line with the needs and resources of a particular site. One resource is the AWStats Project <<http://awstats.sourceforge.net/>> which offers the "AWStats Analyzer" as a free, downloadable tool, distributed under the GNU General Public License,⁸¹ that generates Web, FTP or Mail server statistics, graphically. AWStats works from the command line but also as a CGI [Common Gateway Interface].⁸² Another resource, which requires installation of the Microsoft .NET framework on the client computer, is "Site Monitor Bot" <<http://sitemonitorbot.com/>>, which is free Web site monitoring tool that runs from the "Task Bar of a client computer. Site Monitor Bot checks a site when the client computer is turned on, rechecks every two hours afterward, and warns when a site is down.

An important resource of information on monitoring and evaluation tools is available at "The Open Directory Project" <<http://dmoz.org/>>, which is described as the largest, most comprehensive human-edited directory of the Web. The Open Directory includes a comprehensive set of multi-lingual resources on "Web Design and Development" <http://dmoz.org/Computers/Internet/Web_Design_and_Development/>, which includes an "Accessibility" sub-directory, and companion sub-directories that deal with "Web Usability" and "Authoring".

G. Promotion, information and outreach

Design, development and regular maintenance of content of an accessible Web site are important to its recognition and use as a trusted and valued information resource and service. However, good design and quality content do not translate automatically into a successful and viable Web site. Promotion of a Web site is a combination of technical and human relations skills as well as luck.

Since the suggested starting point in any capacity building activity is a users needs and preferences survey, the results of the survey should provide metrics by which the Web design can assess the effects of decisions on content development, content management and structure of the site on its intended users. The user needs assessment should also include suggestions for linking strategies and ways to reinforce organizational identity and core competencies of the host organization.

Most Web monitoring software can provide statistics on site visitors to provide insights about unintended users and on the length that visitors stay on the sight and the resources they use.

Another related consideration in Web design is to optimization of the site for search engine recognition.⁸³

A comprehensive, multi-lingual set of technical training resources on Web promotion are available from The Open Directory <http://dmoz.org/Computers/Internet/Web_Design_and_Development/Promotion/>.

H. Concluding remarks: reinforcing the training experience

The paper has reviewed issues and trends in the rapidly changing field of information and communications technologies (ICT) from the perspective of accessibility with reasonable adaptation. Accessibility is identified as an essential component of the broad human rights framework and development. The United Nations Standard Rules on Equalization of Opportunities for Persons with Disabilities provide in Rule 5 that accessibility is a precondition for full participation and equality of persons with disabilities. Accessibility has emerged as an important consideration in the process of elaborating an international convention to promote and protect the rights and dignity of persons with disabilities. The Working Group established by the Ad Hoc Committee concerned with the elaboration of the convention met at United Nations New York from 5-16 January 2004 to prepare a draft text of the convention, which includes a specific article on accessibility. Two forces are driving accessibility concerns. One is the pace of elaborating a new international convention to promote and protect the rights and dignity of persons with disabilities, which, when adopted, is expected to include an article on "accessibility". The second force relates to the rapid expansion in mobile communications and growing use of mobile communication devices to access Internet-enabled resources. Mobile users prefer sites that load quickly, are easy to navigate and use, and provide text equivalents for graphical content for low-bandwidth conditions⁸⁴ – in short, accessible Web sites. Accessibility is a concern for all.

The development case for accessibility is its contribution in building a society for all; the value proposition is accessible designs provide the best possible solutions for all and not for any particular constituency.⁸⁵

The challenge of any training experience is how to reinforce the experience, its outcome and promote networks of excellence that may develop among fellows and the training team. One approach is to have training conclude with preparation of an individual or small-group accessible ICT "strategic planning outline". The aim is to have the fellows present the training outcome in a concise way that reflects their own aspirations, concerns, interests and objectives for accessible ICT. Experience suggests an accessible ICT planning outline address five points:

1. Vision for accessible ICT with reasonable adaptation. The Vision statement communicates the need and importance of the accessible ICT initiative and the presents an "image" how this relates to the concerned work group / organizational unit.
2. Mission. The Mission statement describes why the accessible ICT agenda is important to the work group / organization and its specialized constituencies.
3. Objective(s). The Objective statement defines what is to be done in clear, distinct, operational, time-bound and measurable terms.
4. Strategy(ies). The Strategic statement will describe the general direction, guiding values and principles, potential partners, and methods to pursue the accessible ICT agenda.
5. Plan, monitor and evaluate. The Plan would describe proposed actions, concerned agents and intended participants, and timeframe for translating objectives into outputs. The Plan would also identify suggested measures of progress and performance for monitoring, and expected outcomes for evaluation purposes.

To stimulate networking, plan outlines could be published on an accessible ICT training and resources Web site and include a "forum" to exchange ideas and experiences on furthering the accessible ICT agenda.

A "plan outline" for the first phase of the pilot Internet accessibility project undertaken on behalf of the Division for Social Policy and Development of the United Nations Secretariat was submitted in a report of the Secretary-General to the General Assembly at its fifty-fourth session (A/54/388Add.1).⁸⁶

A final consideration: accessibility is always "under construction" given the rapid pace of change in the ICT field and the changing needs, preferences and capacities of end users. An accessibility plan outline is only a beginning in the process of furthering an accessible ICT with reasonable adaptation agenda.

Notes

- ¹ "Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy (E/2000/L.9)" <<http://www.un.org/documents/ecosoc/docs/2000/e2000-19.pdf>>
- ² "Declaration of Principles; Building the Information Society: a global challenge in the new Millennium (WSIS-03/GENEVA/DOC/4-E)" <http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=1161|1160>.
- ³ Elaboration of the new international convention is mandated by General Assembly resolution 56/168 of 19 December 2001 <<http://www.un.org/esa/socdev/enable/disA56168e1.htm>>; General Assembly resolution 58/246 of 23 December 2003, addresses accessibility in operative paragraph. 9 <http://www.un.org/esa/socdev/enable/rights/ares58_246e.htm>.
- ⁴ General Assembly resolution 46/96 of 16 December 1991, operative paragraph 1 <<http://www.un.org/documents/ga/res/46/a46r096.htm>>.
- ⁵ <<http://www.worldenable.net/manila2003/Default.htm>>.
- ⁶ General Assembly resolution 48/96 of 20 December 1993, annex <<http://www.un.org/esa/socdev/enable/dissre00.htm>>.
- ⁷ "Review and appraisal of the World Programme of Action concerning Disabled Person; report of the Secretary-General" (A/58/61), paragraph 9: "A major issue in the elaboration of the convention on the rights of persons with disabilities would be to identify options to bring the disability perspective into international development instruments, such as the Millennium development goals, that do not address specifically the situation of persons with disabilities, and to provide thereby a normative basis for the advancement of current and future generations of persons with disabilities in the context of development." <<http://www.un.org/esa/socdev/enable/disA5861e.htm>>.
- ⁸ Data compiled by the United Nations Conference on Trade and Development (UNCTAD) report a per capita distribution of Internet Hosts (computers with active Internet protocol addresses per 10,000 people) at 422 in 1995 and 3,714 in 2001; the number of mobile devices per capita (per 1,000 people) is reported at 227 in 1995 and 977.77 in 2001 in UNCTAD (2003) *Information and communication technology development indices* (United Nations publication, Sales No. E.03.II.D.14), Appendix 5. Descriptive statistics.
- ⁹ File sharing protocols (P2P) often employ Java-based technologies, which present problems for users of assistive devices; examples of file sharing services include <<http://www.limewire.com/english/content/home.shtml>>, <<http://www.kazaa.com/fr/products/>> and <<http://www.winmx.com/>> among others. Due to legal issues raised in several countries these sites are presented for information only. A discussion of technical and legal issues of file sharing has been prepared by the Electronic Frontiers Foundation (Washington DC (USA), "File-sharing; it's music to our ears" <<http://www.eff.org/share/>>. Accessible P2P is not considered among selected resources presented in the annex to this paper.
- ¹⁰ See report on "International information structures and technologies; the social perspective (United Nations, March 1998)" <<http://www.un.org/esa/socdev/enable/disinet1.htm>>.
- ¹¹ John R. Mathiason and Charles C. Kuhlman, "International Public Regulation of the Internet: Who Will Give You Your Domain Name?" (21 March 1998) <<http://www.intlmgmt.com/domain.html>>.
- ¹² "Web Content Accessibility Guidelines (WCAG) 1.0" <<http://www.w3.org/TR/WCAG10/>>.
- ¹³ The Web Services Working Group functions under the non-profit W3C <<http://www.w3.org/2002/ws/>>, and the Organization for Advancement of Structured Information Standards (OASIS) <<http://www.oasis-open.org/committees/>>, a non-profit consortium, aims to promote and encourage use of structured information standards, such as XML, SGML, and CGM, and develop vertical industry applications, conformance tests and interoperability specifications that make those core standards useable. See Clinton Rapley, "Reconsidering accessible information and communication technologies" (March 2003) <<http://www.worldenable.net/manila2003/paperrapley.htm>>.
- ¹⁴ <<http://www.un.org/documents/ecosoc/docs/2000/e2000-19.pdf>>, paragraph 5.
- ¹⁵ World Summit of the Information Society, "Declaration of Principles (12 December 2003)" (WSIS-03/GENEVA/DOC/0004) <http://www.itu.int/wsis/documents/doc_multi-cn-1161|1160.asp> :
- ¹⁶ "49. The management of the Internet encompasses both technical and public policy issues and should involve all stakeholders and relevant intergovernmental and international organizations. In this respect it is recognized that:
 - a) Policy authority for Internet-related public policy issues is the sovereign right of States. They have rights and responsibilities for international Internet-related public policy issues;
 - b) The private sector has had and should continue to have an important role in the development of the Internet, both in the technical and economic fields;
 - c) Civil society has also played an important role on Internet matters, especially at community level, and should continue to play such a role;
 - d) Intergovernmental organizations have had and should continue to have a facilitating role in the coordination of Internet-related public policy issues;
 - e) International organizations have also had and should continue to have an important role in the development of Internet-related technical standards and relevant policies.
- ¹⁷ "50. International Internet governance issues should be addressed in a coordinated manner. We ask the Secretary-General of the United Nations to set up a working group on Internet governance, in an open and inclusive process that ensures a mechanism for the full and active participation of governments, the private sector and civil society from both developing and developed countries, involving relevant intergovernmental and international organizations and forums, to investigate and make proposals for action, as appropriate, on the governance of Internet by 2005."
- ¹⁸ WIPO Digital Agenda <<http://ecommerce.wipo.int/agenda/index.html>> .
- ¹⁹ *Final Report of the First WIPO Internet Domain Name Process*, April 30, 1999 (Publication, No. 439) <<http://wipo2.wipo.int/process1/report/finalreport.html>> .
- ²⁰ The activities of ICANN are not without their critics, in particular its decision making process. Questions also have been raised about the relationship between ICANN and the assignment of country code top level domains (ccTLDs) with some urging that management of the global Internet be assigned to the International Telecommunications Unit, a specialized agency of the United Nations system. See for example Kieren McCarthy, "EC tells Europe and ICANN to make peace". *The Register* (28 April 2004) <http://www.theregister.co.uk/2004/04/28/ec_icann_warning_shot/> . The

question is a member of the larger set of Internet governance issues to be considered at the Second phase of WSIS (Tunis 2005).

¹⁹ A/37/351/Add.1/ and Add.1/Corr.1, annex, paragraph 7 < <http://www.un.org/esa/socdev/enable/diswpa00.htm> >.

²⁰ < <http://www.un.org/documents/ecosoc/docs/2000/e2000-19.pdf> >; paragraph 7.

²¹ "Declaration of Principles", *op.cit.* paragraphs 8 and 10.

²² World Programme of Action, *op.cit.* paragraph 12.

²³ A/48/96, annex, Rule 5 (Accessibility), *op.cit.*

²⁴ See Leo Valdes (consultant to the United Nations) "Accessibility on the Internet" (6.25.2002)

<<http://www.un.org/esa/socdev/enable/disacc00.htm>>.

²⁵ General Assembly resolution 52/82 of 12 December 1997, paragraph 4 <<http://www.un.org/esa/socdev/enable/disimpe0.htm>>.

²⁶ Regional Workshop towards a Comprehensive and Integral International Convention on Protection and Promotion of the Rights and Dignity of Persons with Disabilities (Bangkok, 14-17 October 2003)

<<http://www.worldenable.net/bangkok2003a/bangkokdraftrev.htm>>.

²⁷ "Report of the Working Group to the Ad Hoc Committee" (A/AC.265/2004/WG.1). Annex I: Draft articles for a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities, Draft Article 19: Accessibility <<http://www.un.org/esa/socdev/enable/documents/ahcwgrreport.doc>>.

²⁸ *Americans with Disabilities Act*, Public Law 336 of the 101st Congress, enacted July 26, 1990; SEC. 101. DEFINITIONS (9) <<http://www.usdoj.gov/crt/ada/pubs/ada.txt>>.

²⁹ John R. Mathiason, "Considerations for the proposed International convention to promote and protect the rights and dignity of persons with disabilities" (July 2002) <<http://www.worldenable.net/mexico2002/considerations.htm>>.

³⁰ "Declaration of Principles", *op.cit.* paragraph 13.

³¹ "Manila Declaration on Accessible Information and Communication Technologies (ICT)", paragraph 2

<<http://www.worldenable.net/manila2003/declaration.htm>>.

³² *Ibid.* paragraph 3.

³³ < <http://www.worldenable.net/manila2003/DesignRecommendations.htm> >.

³⁴ See also Association Braille Net, "To make a site more accessible"

<<http://www.braillet.net/accessibilite/livreblanc/accessibilite.html>>.

³⁵ "Manila Design Recommendations", *op.cit.*; see also Cynthia D. Waddell, "Overview of Law and Guidelines," Chap. 2 in Jim Thatcher et al., *Constructing Accessible Web Sites*, (Birmingham (UK) Glasshaus, 2002), republished July 2003 (San Francisco CA (USA) Apress) <<http://www.apress.com/book/bookDisplay.html?bID=342>>.

³⁶ See < <http://www.worldenable.net/seminars.htm> > and < <http://www.un.org/esa/socdev/enable/accmeetings.htm> >.

³⁷ See John R. Mathiason, "Internet Policy: links between policies and accessibility"

<<http://www.worldenable.net/iapolicy/policypresentation/index.htm>>.

³⁸ See "Online guide to the Standard Rules" < <http://www.worldenable.net/standardrules/default.htm> >.

³⁹ See Cynthia D. Waddell, JD, "Empowering Persons with Disabilities through ICT U.S. Accessible Web Policy & Law"

<<http://www.worldenable.net/manila2003/MatA2a.htm>>.

⁴⁰ < <http://www.intlmgt.com/portfolio/infostruc.html> >.

⁴¹ The concept of a "commons" is "any resource that is used as though it belongs to all; when anyone can use a shared resource simply because one wants or needs to use it, then one is using a commons. A commons is destroyed by uncontrolled use—neither intent of the user, nor ownership are important. See the seminal article: Garrett Hardin, "The Tragedy of the Commons". *Science Magazine*, 162: 3859 (13 December 1968) pp. 1243-1248 <<http://www.sciencemag.org/cgi/content/full/162/3859/1243>>.

⁴² John R. Mathiason and Charles C. Khulman, "The Internet, international regulation & new policy structures". Paper presented to International Studies Association, Panel on Cyberhype or the Deterritorialization of Politics? (Minneapolis MN (USA) 21 March 1998) <<http://www.intlmgt.com/portfolio/ITSpaper.html>>.

⁴³ "Declaration of Principles", *op.cit.* paragraph 50: "International Internet governance issues should be addressed in a coordinated manner. We ask the Secretary-General of the United Nations to set up a working group on Internet governance, in an open and inclusive process that ensures a mechanism for the full and active participation of governments, the private sector and civil society from both developing and developed countries, involving relevant intergovernmental and international organizations and forums, to investigate and make proposals for action, as appropriate, on the governance of Internet by 2005".

⁴⁴ See the discussion of issues in Milton Mueller, John Mathiason, Lee W. McKnight, "Making Sense of "Internet Governance": Defining Principles and Norms". Contributed paper to sixth session of UN ICT Task Force (New York, 25-27 March 2004) <<http://www.unicttaskforce.org/perl/documents.pl?id=1293>>.

⁴⁵ For an overview of issues, see "Security of the Internet" <http://www.cert.org/cnecyc_article/toccnecyc.html>; a review of technical issues is presented at < <http://www.microsoft.com/security/> > for the Microsoft Windows® operating system; <<http://www.info.apple.com/usen/security/index.html>> for the Apple Computer OS X operating system; and < <http://www.freebsd.org/security/> > for the FreeBSD operating system.

⁴⁶ Stein Schjolberg, Chief Judge, Moss District Court (Norway), "The Legal Framework - Unauthorized Access to Computer Systems; Penal Legislation in 44 Countries" (7 April 2003) <<http://www.mosstingrett.no/info/legal.html>> >; for an example of a national report see, *2003 Australian Computer Crime and Security Survey* <<http://national.ascert.org.au/render.html?it=2001>>.

⁴⁷ "Effective measures to prevent and control computer-related crime; report of the Secretary-General" (E/CN.15/2002/8) <<http://www.unodc.org:80/pdf/crime/commissions/11comm/8f.pdf>>.

⁴⁸ Free download of the publication is available via <<http://www.free-culture.cc/>>.

⁴⁹ Eric S. Raymond, "The Cathedral and the Bazaar" <http://www.firstmonday.dk/issues/issue3_3/raymond/> - an important discussion of the origin, philosophy and rationale of open-source software; see also <<http://opensource.oreilly.com/>>.

⁵⁰ John R. Mathiason, "Planning for Accessibility" (1998)

<<http://www.worldenable.net/iaplanning/planningpresentation/index.htm>>.

⁵¹ See "Usability guide" <http://www.usablenet.com/accessibility_usability/usability.html>.

- ⁵² Leo Valdes, "Design Considerations for Delivering Online Information" (2003) <<http://www.worldenable.net/manila2003/MatC1a.htm>>.
- ⁵³ Oliva Acosta and Vision Office Support Services Ltd (North Vancouver BC (Canada)), consultants to the United Nations, "Assessment Report" (1998) <<http://www.visionoffice.com/spd/papers/papers3.htm>>.
- ⁵⁴ John R. Mathiason, "Planning for Accessibility" *op.cit.*, 'Being a good producer' <<http://www.worldenable.net/iaplanning/producer.html>>.
- ⁵⁵ <<http://www.w3c.org>>.
- ⁵⁶ <<http://www.w3.org/TR/WCAG10/>>.
- ⁵⁷ Hypertext Markup Language is *lingua franca* for publishing hypertext content on the World Wide Web; the current standard is HTML 4.01 <<http://www.w3.org/TR/html4/>>.
- ⁵⁸ Extensible Markup Language is *lingua franca* for data representation on the World Wide Web. The XML Core Working Group publishes recommendations, some of which are still drafts, on XML, which include XML 1.0 (Third Edition) and XML 1.1 <<http://www.w3.org/XML/Core/#Publications>>.
- ⁵⁹ *List of Checkpoints for Web Content Accessibility Guidelines 1.0* <<http://www.w3.org/TR/WCAG10/checkpoint-list.html>>.

Priorities

Each checkpoint has a priority level assigned by the Working Group based on the checkpoint's impact on accessibility.

[Priority 1]

A Web content developer must satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use Web documents.

[Priority 2]

A Web content developer should satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing Web documents.

[Priority 3]

A Web content developer may address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to Web documents.

Some checkpoints specify a priority level that may change under certain (indicated) conditions.

Priority 1 checkpoints

In General (Priority 1)

1.1 Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). This includes: images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ASCII art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.

2.1 Ensure that all information conveyed with color is also available without color, for example from context or markup.

4.1 Clearly identify changes in the natural language of a document's text and any text equivalents (e.g., captions).

6.1 Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.

6.2 Ensure that equivalents for dynamic content are updated when the dynamic content changes.

7.1 Until user agents allow users to control flickering, avoid causing the screen to flicker.

14.1 Use the clearest and simplest language appropriate for a site's content.

And if you use images and image maps (Priority 1)

1.2 Provide redundant text links for each active region of a server-side image map.

9.1 Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

And if you use tables (Priority 1)

5.1 For data tables, identify row and column headers.

5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.

And if you use frames (Priority 1)

12.1 Title each frame to facilitate frame identification and navigation.

And if you use applets and scripts (Priority 1)

6.3 Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.

And if you use multimedia (Priority 1)

1.3 Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.

1.4 For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.

And if all else fails (Priority 1)

11.4 If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.

Priority 2 checkpoints

In General (Priority 2)

2.2 Ensure that foreground and background color combinations provide sufficient contrast when viewed by someone having color deficits or when viewed on a black and white screen. [Priority 2 for images, Priority 3 for text].

- 3.1 When an appropriate markup language exists, use markup rather than images to convey information.
- 3.2 Create documents that validate to published formal grammars.
- 3.3 Use style sheets to control layout and presentation.
- 3.4 Use relative rather than absolute units in markup language attribute values and style sheet property values.
- 3.5 Use header elements to convey document structure and use them according to specification.
- 3.6 Mark up lists and list items properly.
- 3.7 Mark up quotations. Do not use quotation markup for formatting effects such as indentation.
- 6.5 Ensure that dynamic content is accessible or provide an alternative presentation or page.
- 7.2 Until user agents allow users to control blinking, avoid causing content to blink (i.e., change presentation at a regular rate, such as turning on and off).
- 7.4 Until user agents provide the ability to stop the refresh, do not create periodically auto-refreshing pages.
- 7.5 Until user agents provide the ability to stop auto-redirect, do not use markup to redirect pages automatically. Instead, configure the server to perform redirects.
- 10.1 Until user agents allow users to turn off spawned windows, do not cause pop-ups or other windows to appear and do not change the current window without informing the user.
- 11.1 Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported.
- 11.2 Avoid deprecated features of W3C technologies.
- 12.3 Divide large blocks of information into more manageable groups where natural and appropriate.
- 13.1 Clearly identify the target of each link.
- 13.2 Provide metadata to add semantic information to pages and sites.
- 13.3 Provide information about the general layout of a site (e.g., a site map or table of contents).
- 13.4 Use navigation mechanisms in a consistent manner.
- And if you use tables (Priority 2)
- 5.3 Do not use tables for layout unless the table makes sense when linearized. Otherwise, if the table does not make sense, provide an alternative equivalent (which may be a linearized version).
- 5.4 If a table is used for layout, do not use any structural markup for the purpose of visual formatting.
- And if you use frames (Priority 2)
- 12.2 Describe the purpose of frames and how frames relate to each other if it is not obvious by frame titles alone.
- And if you use forms (Priority 2)
- 10.2 Until user agents support explicit associations between labels and form controls, for all form controls with implicitly associated labels, ensure that the label is properly positioned.
- 12.4 Associate labels explicitly with their controls.
- And if you use applets and scripts (Priority 2)
- 6.4 For scripts and applets, ensure that event handlers are input device-independent.
- 7.3 Until user agents allow users to freeze moving content, avoid movement in pages.
- 8.1 Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies [Priority 1 if functionality is important and not presented elsewhere, otherwise Priority 2.]
- 9.2 Ensure that any element that has its own interface can be operated in a device-independent manner.
- 9.3 For scripts, specify logical event handlers rather than device-dependent event handlers.

Priority 3 checkpoints

In General (Priority 3)

- 4.2 Specify the expansion of each abbreviation or acronym in a document where it first occurs.
- 4.3 Identify the primary natural language of a document.
- 9.4 Create a logical tab order through links, form controls, and objects.
- 9.5 Provide keyboard shortcuts to important links (including those in client-side image maps), form controls, and groups of form controls.
- 10.5 Until user agents (including assistive technologies) render adjacent links distinctly, include non-link, printable characters (surrounded by spaces) between adjacent links.
- 11.3 Provide information so that users may receive documents according to their preferences (e.g., language, content type, etc.)
- 13.5 Provide navigation bars to highlight and give access to the navigation mechanism.
- 13.6 Group related links, identify the group (for user agents), and, until user agents do so, provide a way to bypass the group.
- 13.7 If search functions are provided, enable different types of searches for different skill levels and preferences.
- 13.8 Place distinguishing information at the beginning of headings, paragraphs, lists, etc.
- 13.9 Provide information about document collections (i.e., documents comprising multiple pages.).
- 13.10 Provide a means to skip over multi-line ASCII art.
- 14.2 Supplement text with graphic or auditory presentations where they will facilitate comprehension of the page.
- 14.3 Create a style of presentation that is consistent across pages.
- And if you use images and image maps (Priority 3)
- 1.5 Until user agents render text equivalents for client-side image map links, provide redundant text links for each active region of a client-side image map.
- And if you use tables (Priority 3)
- 5.5 Provide summaries for tables.
- 5.6 Provide abbreviations for header labels.
- 10.3 Until user agents (including assistive technologies) render side-by-side text correctly, provide a linear text alternative (on the current page or some other) for all tables that lay out text in parallel, word-wrapped columns.
- And if you use forms (Priority 3)
- 10.4 Until user agents handle empty controls correctly, include default, place-holding characters in edit boxes and text areas.

⁶⁰ EC Communication "eEurope 2002: Accessibility of Public Web Sites and their Content", adopted on 25 September 2001, states that ensuring availability of accessible public Web sites and their content will be furthered by adoption by the 15 EU member states of the Web Accessibility Initiative (WAI) Guidelines (WCAG 1.0) for public Web sites by the end of 2001. See also, European Commission, "Information Providers Guidelines" <http://europa.eu.int/comm/ipg/index_en.htm>.

⁶¹ Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220). Electronic and Information Technology of the United States <<http://www.section508.gov>>.

⁶² Guide to the Section 508 Standards for Electronic and Information Technology <<http://www.access-board.gov/sec508/guide/index.htm>>.

Overview of Technical Standards (Subpart B)

The standards provide criteria specific to various types of technologies, including:

- software applications and operating systems
- web-based information or applications
- telecommunication products
- video and multimedia products
- self contained, closed products (e.g., information kiosks, calculators, and fax machines)
- desktop and portable computers

Software Applications and Operating Systems (1194.21)

Most of the specifications for software pertain to usability for people with vision impairments. For example, one provision requires alternative keyboard navigation, which is essential for people with vision impairments who cannot rely on pointing devices, such as a mouse. Other provisions address animated displays, color and contrast settings, flash rate, and electronic forms, among others.

Web-based Intranet and Internet Information and Applications (1194.22)

The criteria for web-based technology and information are based on access guidelines developed by the Web Accessibility Initiative of the World Wide Web Consortium. Many of these provisions ensure access for people with vision impairments who rely on various assistive products to access computer-based information, such as screen readers, which translate what's on a computer screen into automated audible output, and refreshable Braille displays. Certain conventions, such as verbal tags or identification of graphics and format devices, like frames, are necessary so that these devices can "read" them for the user in a sensible way. The standards do not prohibit the use of web site graphics or animation. Instead, the standards aim to ensure that such information is also available in an accessible format. Generally, this means use of text labels or descriptors for graphics and certain format elements. (HTML code already provides an "Alt Text" tag for graphics which can serve as a verbal descriptor for graphics). This section also addresses the usability of multimedia presentations, image maps, style sheets, scripting languages, applets and plug-ins, and electronic forms.

The standards apply to Federal web sites but not to private sector web sites (unless a site is provided under contract to a Federal agency, in which case only that web site or portion covered by the contract would have to comply). Accessible sites offer significant advantages that go beyond access. For example, those with "text-only" options provide a faster downloading alternative and can facilitate transmission of web-based data to cell phones and personal digital assistants.

Telecommunications Products (1194.23)

The criteria of this section are designed primarily to ensure access to people who are deaf or hard of hearing. This includes compatibility with hearing aids, cochlear implants, assistive listening devices, and TTYs. TTYs are devices that enable people with hearing or speech impairments to communicate over the telephone; they typically include an acoustic coupler for the telephone handset, a simplified keyboard, and a visible message display. One requirement calls for a standard non-acoustic TTY connection point for telecommunication products that allow voice communication but that do provide TTY functionality. Other specifications address adjustable volume controls for output, product interface with hearing technologies, and the usability of keys and controls by people who may have impaired vision or limited dexterity or motor control.

Video or Multimedia Products (1194.24)

Multimedia products involve more than one media and include, but are not limited to, video programs, narrated slide production, and computer generated presentations. Provisions address caption decoder circuitry (for any system with a screen larger than 13 inches) and secondary audio channels for television tuners, including tuner cards for use in computers. The standards also require captioning and audio description for certain training and informational multimedia productions developed or procured by Federal agencies. The standards also provide that display or presentation of alternate text or audio descriptions shall be user-selectable unless permanent.

Self Contained, Closed Products (1194.25)

This section covers products that generally have imbedded software but are often designed in such a way that a user cannot easily attach or install assistive technology. Examples include information kiosks, information transaction machines, copiers, printers, calculators, fax machines, and similar types of products. The standards require that access features be built into the system so users do not have to attach an assistive device to it. Other specifications address mechanisms for private listening (handset or a standard headphone jack), touch screens, auditory output and adjustable volume controls, and location of controls in accessible reach ranges.

Desktop and Portable Computers (1194.26)

This section focuses on keyboards and other mechanically operated controls, touch screens, use of biometric form of identification, and ports and connectors.

Functional Performance Criteria (Subpart C)

The performance requirements of this section are intended for overall product evaluation and for technologies or components for which there is no specific requirement under the technical standards in Subpart B. These criteria are designed to ensure that the individual accessible components work together to create an accessible product. They cover operation, including input and control functions, operation of mechanical mechanisms, and access to visual and audible information. These provisions are structured to allow people with sensory or physical disabilities to locate, identify, and operate input, control and mechanical functions and to access the information provided, including text, static or dynamic images, icons, labels, sounds or incidental operating cues.

Information, Documentation, and Support (Subpart D)

The standards also address access to all information, documentation, and support provided to end users (e.g., Federal employees) of covered technologies. This includes user guides, installation guides for end-user installable devices, and customer support and technical support communications. Such information must be available in alternate formats upon request at no additional charge. Alternate formats or methods of communication, can include Braille, cassette recordings, large print, electronic text, Internet postings, TTY access, and captioning and audio description for video materials.

⁶³ Web-based Intranet and Internet Information and Applications (1194.22): (a) Text Tags, (b) Multimedia Presentations, (c) Color, (d) Readability, (e) Serve-Side Image Maps, (f) Client-Side Image Maps, (g)&(h) Data Tables, (i) Frames, (j) Flicker Rate, (k) Text-Only Alternative, (l) Scripts, (m) Applets and Plug-Ins, (n) Electronic Forms, (o) Navigation Links, (p) Time Delays
<<http://www.access-board.gov/sec508/guide/1194.22.htm>>

⁶⁴ <<http://jimthatcher.com/>>.

⁶⁵ "Developer guidelines" <<http://www-3.ibm.com/able/guidelines.html>>.

⁶⁶ <<http://www.worldenable.net/manila2003/DesignRecommendations.htm>>.

⁶⁷ <<http://www.worldenable.net/manila2003/Default.htm>>.

⁶⁸ Universal Design is based on seven principles: (1) Equitable use - the design is useful and relevant to a wide group of users; (2) Flexibility in use - the design accommodates a wide range of individual preferences and abilities; (3) Simple and intuitive use - the design is easy to understand regardless of the knowledge, experience, language skills or concentration level of the user; (4) Perceptive information - the design communicates information effectively to the user regardless of the ambient condition or the sensory abilities of the user; (5) Tolerance for error - the design minimizes the hazards and adverse consequences of unintended actions of the user; (6) Low physical effort - the design can be used easily, efficiently and comfortably with a minimum of fatigue; and (7) Size and space for approach and use - the size and space for approach, reach, manipulation and use should be appropriate regardless of the body size, posture or mobility of the user. See "Report" of International Seminar on Environmental Accessibility; planning and design of accessible urban development in developing countries (Beirut, 30 November - 3 December 1999) <<http://www.un.org/esa/socdev/enable/disisea3.htm>>. The following premises are associated with Universal Design: (a) varying ability is not a special condition of the few but a common characteristic of being human and we change physically and intellectually throughout our lives; (b) if a design works well for people with disabilities, it works better for everyone; (c) at any point in our lives, personal self-esteem, identity, and well-being are deeply affected by our ability to function in our physical surroundings with a sense of comfort, independence and control; and (d) usability and aesthetics are mutually compatible <<http://www.adaptenv.org/universal/index.php>>.

⁶⁹ "Usability" refers to the quality of a user's experience when interacting with a product or system — whether a Web site, a software application, mobile technology, or any user-operated device.

Several factors can affect the user's experience with a product or system, which include:

1. **Ease of learning:** How fast can a user who has never seen the user interface before learn to use it sufficiently well to accomplish basic tasks?
2. **Efficiency of use:** Once an experienced user has learned to use the system, how fast can he or she accomplish tasks?
3. **Memorability:** If a user has used the system before, can he or she remember enough to use it effectively the next time or does the user have to start over again learning everything?
4. **Error frequency and severity:** How often do users make errors while using the system, how serious are these errors, and how do users recover from these errors?

5. **Subjective satisfaction:** How much does the user like using the system? In *Usability Basics* <<http://www.usability.gov/basics/index.html>>.

⁷⁰ <<http://www.braillet.net/accessibilite/livreblanc/accessibilite.html>>.

⁷¹ Cynthia D. Waddell, JD. "The Growing Digital Divide in Access for People with Disabilities: overcoming barriers to participation" (1999), p. 2 at <http://www.icdri.org/CynthiaW/the_digital-divide.htm>.

⁷² Cynthia D. Waddell, "Overview of Law and Guidelines," Chap. 2 in Jim Thatcher et al., *Constructing Accessible Web Sites*, (Birmingham (UK) Glasshaus, 2002); republished July 2003 (San Francisco CA (USA) Apress)
<<http://www.apress.com/book/bookDisplay.html?bID=342>>.

⁷³ Leo Valdes, "Accessibility on the Internet" (1998-2003) <<http://www.un.org/esa/socdev/enable/disacc00.htm>>.

⁷⁴ Leo Valdes, "Making Internet and Communications Technologies Accessible (2003)
<<http://www.worldenable.net/manila2003/MatC2a.htm>>.

⁷⁵ An Intranet is a network within an organization that uses Internet technologies to enable users to find, use, and share documents and Web pages. Corporations use intranets to communicate with employees. Intranets use traditional Internet protocols, TCP/IP and HTTP to transfer data. They usually reside behind firewalls, for security, and are not limited by physical location. Intranets can link users to the outside Internet, and with proper security in place may use public networks to transfer data. <<http://guide.darwinmag.com/technology/web/intranet/index.html>>.

⁷⁶ An Extranet is a private network that uses the Internet protocol and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses. An extranet can be viewed as part of a company's intranet that is extended to users outside the organization.

<<http://www.doc.govt.nz/Community/Extranet/index.asp>>.

⁷⁷ A Portal is an internal Website that provides proprietary corporate information to employees as well as access to selected websites, such as those of suppliers. Individuals or user groups are given the ability to customize the portal page, which includes a search engine for internal documents. < <http://guide.darwinmag.com/technology/web/intranet/index.html>>. See also Jim Rapoza, "Portals & Knowledge Management". *eWeek* (5 April 2004) <<http://www.eweek.com/article2/0,1759,1559915,00.asp>>.

⁷⁸ Disabled Peoples Association of Singapore, "PCs and the Disabled" < <http://www.dpa.org.sg/DPA/pcknowhow.htm>>.

⁷⁹ Center for Assistive Technologies home page < <http://cat.buffalo.edu/>>; Foundation for Assistive Technology home page < <http://www.fastuk.org/>>; Assistive Technology Centre home page <<http://assist-tech.ednet.ns.ca/>>.

⁸⁰ Peter Blake, "A Review of Free, Online Accessibility Tools" (February 2004)

<<http://www.webaim.org/techniques/articles/freetools/>>.

⁸¹ < <http://www.gnu.org/copyleft/gpl.html>>.

⁸² The Common Gateway Interface (CGI) is a standard for interfacing external applications with information servers, such as HTTP or Web servers. A plain HTML document that the Web daemon retrieves is static, while a CGI program is executed in real-time and can output dynamic information <<http://hoohoo.ncsa.uiuc.edu/cgi/intro.html>>.

⁸³ "Search Engine Submission Tips" < <http://searchenginewatch.com/webmasters/index.php>>.

⁸⁴ Opera Software, "Authoring for Small-Screen Rendering (SSR)" <<http://www.opera.com/products/smartphone/dev/>>; and "Making Small Devices Look Great" <<http://my.opera.com/community/dev/device/>>.

⁸⁵ Debra Donston, "Web access for all". *eWeek* (May 19, 2003) pp. 54-57 <<http://www.eweek.com/article2/0,1759,1090387,00.asp>>.

⁸⁶ "Implementation of the World Programme of Action concerning Disabled Persons; report of the Secretary-General" (A/54/388 and Add.1), Addendum I. Analytical review of progress in equalization of opportunities by, for and with persons with disabilities:

20. The strategic plan [for Internet accessibility] had five main points:

(a) Vision: formulation of a shared vision for the Internet accessibility initiative was important for building awareness and a general consensus for first principles and for changes envisaged concerning the ways in which social development information goods would be presented through Internet technologies. The vision identified entailed provision of timely and relevant accessible social development information goods for all; and the title of the site was identified as "Gateway for social policy and development";

(b) Scope and priorities: the time-frame for design, testing and implementation of a functional Internet site that would meet generally accepted international standards - February to May 1998 - was tight. The scope of the Gateway initiative was, first, provision of accessible information goods for persons with disabilities. The second concern was design of accessible Internet-based services to support two priority observances in the social development field: the 1999 International Year of Older Persons, and preparations for the special session of the General Assembly to consider the outcome of the World Summit for Social Development. The initiative focused on Internet accessibility for all, with reference to specific priorities of the global social development programme of the United Nations;

(c) Feasibility and strategic components: the time-frame for the Gateway initiative required selection, testing and rapid application of best-available accessibility concepts and design tools rather than extensive comparative studies of emerging practices and technologies. An important contribution to the initiative was the provision by the Microsoft Corporation in early 1998 of a compact disk read-only memory (CD-ROM) compilation of Internet accessibility design concepts and tools. A great deal of relevant material was also identified on the Internet. Chief among the sites consulted were the World Wide Web Consortium and its "Web Content Accessibility Guidelines", and the Center for Applied Special Technology and its on-line Web accessibility evaluation tool, "Bobby" (<http://www.cast.org>). Since the Gateway initiative for Internet accessibility was being implemented within the framework of the Internet site of the United Nations (<http://www.un.org>), strategic components of the Gateway were designed to fit within the basic Internet architecture of the United Nations site consistent with universal Web design standards and relevant accessibility guidelines. Excellent cooperation was obtained at departmental level of the United Nations Secretariat. Critiques of Gateway designs and structures came from a diverse set of beta testers, representing all specialized programme constituencies: governmental, non-governmental and civil society;

(d) Implementation plan: the Internet accessibility initiative was outsourced to an international consultant team with considerable expertise in communications planning, Internet design, systems integration and training. The international consultant team prepared a prototype Web design within two weeks of joining the project and made effective and strategic use of communications technologies to meet the schedule of deliverables set by the Division for Social Policy and Development. The decision to outsource was taken since the Gateway would be the first Internet presence in the United Nations system planned and designed in accordance with generally acceptable standards for accessible Web design;

(e) Monitoring and evaluation: the Internet accessibility pilot project had a tight schedule for design and implementation and was carried out by an international consultant team. A critical task was joint determination of critical milestones for conceptual designs, for delivery of content by the concerned substantive specialists, for coordination with the concerned technical services and for systematic feedback on design options from beta testers representative of the specialized constituencies for the global social development programme of the United Nations. For instance, a proposed design for the International Year of Older Persons Web site was positively critiqued by a concerned governmental representative, albeit with a reminder of the need for accessible language support. Critiques from persons with disabilities served to make the Persons with Disabilities Web site easy and efficient to navigate with text browsers. Design options were evaluated continually using on-line tools to assess compatibility with various Internet browsers, communications capacities and universal design principles. The May delivery of the release candidate of an operational "Gateway for social policy and development" was accompanied by an intensive user orientation and training session to promote awareness of sustainable Web accessibility in the social development field. <<http://www.un.org/esa/socdev/enable/disa54e6.htm>>.

Annex I-A

MANILA DECLARATION ON ACCESSIBLE INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICT)

We, the participants in the Interregional Seminar and Demonstration Workshop on Accessible ICT and Persons with Disabilities, held at Manila from 3 to 7 March 2003, representing the countries of Bangladesh, Brunei Darussalam, Cambodia, Canada, Indonesia, Lao People's Democratic Republic, Myanmar, Pakistan, the Philippines, Thailand, Vietnam, and the United States of America, declare:

1. Possibilities to access the virtual world and knowledge-based economies by means of the global Internet and related information and communications technologies remain limited to many people in countries, persons with disabilities in particular. Strategic initiatives to address a digital divide must also address a human capabilities divide and be appropriate to countries. Strategic initiatives should include, but not be limited to, investments in education and training to promote literacy and build national capacities for sustainable livelihoods to improve well-being. Initiatives must be gender sensitive, cohort neutral and disability responsive.
2. Accessibility is recognized as an essential component of broad rights-based approaches to development. As presented in Rule 5 (Accessibility) of the United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities,¹ accessibility is important for equalization of opportunities in the full and effective exercise of civil and political rights as well as economic, social and cultural.² Access to the physical environment and access to information and communications impact the full scope of social life and development for all and can promote equality and opportunities for full participation for everyone.
3. Our seminar and workshop have focused on accessible information and communications technologies (ICT) with reasonable accommodation because it empowers and enables persons with disabilities to full and equal participation in social, economic and cultural life and in their exercise of civil and political rights. At the same time, we have learned from our presentations and dialogue that ICT is a member of the larger set of electronic and information technology products, equipment systems and services that store, process, transmit, convert, duplicate or receive digital information. Electronic and information technology products include photocopiers, computers, personal digital assistants (PDAs), facsimile machines, information transaction machines or kiosks, automatic transaction machines (ATMs), voting machines, operating systems, software (including application generators and development tools), Web sites, public mass media (radio, television and cinema) and telecommunications systems and devices. While accessibility in the full range of electronic and information technology products and services is beyond the scope of our seminar and workshop, as a general consideration, we are of the view that electronic and information technology products and services should provide accessibility with reasonable accommodation. Similar considerations pertain to provision of accessibility with reasonable accommodation in transportation systems and their user interfaces.
4. Accessible ICT with reasonable accommodation recognizes the flexibility of technologies to provide appropriate functionality necessary for meeting user needs and preferences. Addressing ICT accessibility with reasonable accommodation empowers and serves as a catalyst and instrument for re-engineering governmental, as well as non-governmental and enterprise processes. Participants of the seminar and workshop note that the promotion and realization of ICT accessibility with reasonable accommodation requires consultation and advocacy of the fundamental importance of the topic with governments at all levels and in all sectors of the societies in which we live and work.
5. A major contribution of the seminar and workshop has been the opportunities provided for exchanges of knowledge, ideas and good practices to promote and realize accessible ICT with reasonable accommodation. Participants of the seminar and workshop attach special importance to the continuation of these exchanges as follow-up to the seminar and workshop by means of open and transparent networks concerning accessible ICT. A primary objective of the networks would be to promote awareness and support for accessible ICT with reasonable accommodation appropriate to the conditions in our countries that would

meet the needs and preferences of diverse users. The networks also should provide opportunities to inform about good practices as well as resources available to advocate accessible ICT with reasonable accommodation, to create awareness and to build national capacities. In this regard, participants note with considerable appreciation the offer of the Asia-Pacific Office of Disabled Peoples' International (DPI) and the International Center for Disability Resources on the Internet (ICDRI) (non-governmental organizations) to moderate network dialogue and exchanges in close association with the National Organizing Committee, in particular the "WebAble" publication of the National Council for the Welfare of Disabled Persons (NCWDP) of the Republic of the Philippines.

6. Participants recognize that accessible ICT with reasonable accommodation is part of broad rights-based approaches to development. Operationally, accessible ICT with reasonable accommodation provides the flexibility to accommodate the needs and preferences of the widest range of users. The value proposition of accessible ICT with reasonable accommodation is equality through inclusive solutions based on full and effective participation. Accessible ICT with reasonable accommodation builds upon Universal Design concepts and principles and are summarized in the attached "Manila Accessible ICT (information and communications technologies) Design Recommendations."

7. Participants further recognize that promotion and implementation of the "Manila Accessible ICT Design Recommendations" will involve commitments of resources of a normative, substantive and financial nature. Three products assume special importance for concerted, practical and immediate follow-up to the seminar and workshop; and the support of the United Nations is urgently requested:

(a) Preparation of a global comparative study on norms and standards related accessibility with reasonable accommodation that will provide critical input for promotion and advocacy of the "Manila Accessible ICT Design Recommendations" in countries and respond to the request of the first session of the Ad Hoc Committee to consider proposals for a comprehensive and integral convention to promote and protect the rights and dignity of persons with disabilities concerning input from experts and persons with disabilities in the matter of accessibility with reasonable accommodation (A/57/357, paragraph 15, as endorsed by General Assembly resolution 57/229 of 18 December 2002).

(b) Development, testing and evaluation of a pilot validation tool to test and evaluate online Web site compliance with the minimum threshold of accessibility with reasonable accommodation set forth in the "Manila Accessible ICT Design Recommendations."

(c) Preparation of a scheme for training and resource materials on norms, standards and substantive aspects of accessibility with reasonable accommodation to build national capacities and to provide input to activities of the accessible ICT network.

Adopted at Manila, 7 March 2003 < <http://www.worldenable.net/manila2003/declaration.htm> >

Notes:

¹ General Assembly resolution 48/96, annex of 20 December 1993 <<http://www.un.org/esa/socdev/enable/dissre00.htm>>.

² See *International Covenant on Civil and Political Rights*, adopted by General Assembly resolution 2200A (XXI) of 16 December 1966 <http://www.unhchr.ch/html/menu3/b/a_ccpr.htm>; and *International Covenant on Economic, Social and Cultural Rights*, adopted by General Assembly resolution 2200A (XXI) of 16 December 1966 <http://www.unhchr.ch/html/menu3/b/a_ceschr.htm>.

Annex I-B

MANILA ACCESSIBLE INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICT) DESIGN RECOMMENDATIONS

Recognizing that information and communication technologies (ICT) accessibility barriers are systemic and reach all sectors of our global economy, and that ICT accessibility barriers prevent the global community of persons with disabilities from full and equal participation and enjoyment in daily life; and

Noting that the global community is prevented from being enriched by our diverse abilities and contributions; and

Acknowledging that Universal Design¹ concepts inform public policy by calling for the development of ICT flexible enough to accommodate the needs and preferences of the broadest range of users, regardless of age or disability or the limitations of our computer equipment; and

Noting that accessible ICT:

- removes communications and information access barriers that restrict business and social interactions between persons with disabilities and non-disabled persons;
- removes age-related barriers to participation in society;
- reduces language and literacy-related barriers to society;
- reduces risk of information worker injuries and
- enhances global commerce opportunities.²

Therefore, the "Manila Declaration on Accessible ICT" confirms that we are at a significant crossroad where ICT accessibility barriers need to be addressed at all levels effectively and urgently, and call for progress on the elaboration of a comprehensive and integrated international convention on the rights of persons with disabilities in the context of development, endorsed by General Assembly resolution 56/168 of 19 December 2001.

The normative basis for the "Manila Accessible ICT Design Recommendations" is Rule 5 (Accessibility) of the United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities³ that provides "States should recognize the overall importance of accessibility in the process of equalization of opportunities ... and should ... undertake measures to provide access to information and communication."

The conceptual basis for the "Manila Accessible ICT Design Recommendations" is Universal Design in the light of its concern with designs that meet the needs of diverse users through inclusive solutions and open and democratic participation. The business case for Universal Design is based on the fact that benefits extend beyond the community of people with disabilities. In the case of ICT, designs based on universal concepts provide for flexibility to accommodate those who operate in low bandwidth settings, use cell phones to synthesize text and access the Internet by means of alternative devices.

Five considerations in the design for accessibility with reasonable accommodation are important:

- Content is organized and presented appropriate to the interests, needs and preferences of end users;
- Aesthetics of the design accommodate the needs and preferences of diverse users;
- Accessibility of the design benefits all users as well as users with special needs;
- Usability of the design allows users to access, navigate, search and leave the information resource easily, intuitively and without barriers;
- Sustainability of the design is based on content management that affords flexibility to accommodate needs and preferences of diverse users.

The operational focus of the "Manila Accessible ICT Design Recommendations" is timely and reliable information goods and services appropriate to each user.

The "Manila Accessible ICT Design Recommendations" are based on the premise that accessibility by reasonable accommodation can be achieved easily and efficiently with the application of "first principles" of accessibility. For accessible Web design, two principles are central:⁴

- Every visual element should be implemented with a textual element that describes it. Alternative text <alt> allows for description of graphical images.
- The structure and layout of the document should be dealt with separately. Structure is defined by HTML (Hypertext Markup Language) elements and attributes; and layout is defined by style sheets. Separation of layout from content aids text browsers to extract easily the logical structure of the document.

The "Manila Accessible ICT Design Recommendations" seek to address problems of barriers in Web-based information goods and services with the identification of a select set of "electronic curb cuts"⁵ that provide flexibility for accommodating each user's needs and preferences.⁶ For example:

1. Provide an Access Instruction page for visitors (explaining the accessibility features of the Web site and providing an e-mail hyperlink for visitors to communicate problems with Web page accessibility);
2. Provide support for text browsers and descriptive hyperlinks (links such as "this" and "click here" do not alone convey the nature of the target link);
3. Attach ALT<alt> (alternative) text to graphic images so that assistive computer technology such as screen readers can reach the content;
4. For each photograph contributing meaningful content to the page, provide a "D" hyperlink to a page providing descriptive text of the image;
5. Provide text transcriptions or descriptions for all audio and video clips;
6. Provide alternative mechanisms for online forms since forms are not supported by all browsers (such as e-mail or voice/TTY phone numbers);
7. Avoid access barriers, such as the posting of documents in Adobe® PDF (Portable Document Format), non-linear format, Frame format or requiring visitors to download software to access the content. If posting in Adobe® PDF, accessible HTML (Hypertext Markup Language) or ASCII text must also be posted by the Web master converting the document.⁷

The "Manila Accessible ICT Design Recommendations" represent a minimum threshold in accessibility with reasonable accommodation.

These recommendations are always "under construction" to promote provision of flexibility to accommodate needs and preferences of users of electronic and information technology products and services in response to continuing technical innovations.

Adopted at Manila, 7 March 2003 <<http://www.worldenable.net/manila2003/DesignRecommendations.htm>>

N.B. Products mentioned are trademarked to their respective manufacturers or publishers. They are provided for reference and do not constitute endorsement.

Notes:

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- ¹ Universal design is based on the following premises: (a) varying ability is not a special condition of the few but a common characteristic of being human and we change physically and intellectually throughout our lives; (b) if a design works well for people with disabilities, it works better for everyone; (c) at any point in our lives, personal self-esteem, identity, and well-being are deeply affected by our ability to function in our physical surroundings with a sense of comfort, independence and control; and (d) usability and aesthetics are mutually compatible <<http://www.adaptenv.org/universal/index.php>>. See "Report" of International Seminar on Environmental Accessibility; planning and design of accessible urban development in developing countries (Beirut, 30 November - 3 December 1999) <<http://www.un.org/esa/socdev/enable/disisea.htm>>. See also, Leslie Kanes Weisman, "Creating justice, sustaining life: the role of Universal Design in the 21st century"; Keynote address to Twentieth anniversary celebration, Adaptive Environments Center (Boston, MA, April 1999), which discusses three tenets of Universal Design: "First, universal design reminds us that there is no separation between mind and body, and between people and their environments. Second, universal design recognizes that there is no separation between human health, environmental health, and social justice. Third, universal design upholds the democratic ideals of social equality and personal empowerment because universal designers strive to create products and spatial environments that are designed to provide the same level of comfort, accessibility and assistance to multiple users and multiple publics." <<http://www.adaptiveenvironments.org/index.php?option=Resource&articleid=151&topicid=28>>.
- ² Cynthia D. Waddell, JD. "The Growing Digital Divide in Access for People with Disabilities: overcoming barriers to participation" (1999), p. 2 at <http://www.icdri.org/CynthiaW/the_digital-divide.htm>. (Hereinafter Digital Divide Paper).
- ³ General Assembly resolution 48/96, annex, of 20 December 1993 <<http://www.un.org/esa/socdev/enable/dissre00.htm>>.
- ⁴ Association Braille Net, "To make a site more accessible" <<http://www.brailenet.org/accessibilite/livreblanc/accessibilite.html>>.
- ⁵ Digital Divide Paper, *op. cit* p. 10-11.
- ⁶ "Implementation of the World Programme of Action concerning Disabled Persons, report of the Secretary-General (A/54/388/Add.1)" <<http://www.un.org/esa/socdev/enable/disa54e6.htm#A>>.
- ⁷ Cynthia D. Waddell, "Overview of Law and Guidelines," Chap. 2 in Jim Thatcher et al., *Constructing Accessible Web Sites*, (Birmingham (UK) Glasshaus, 2002), republished July 2003 (San Francisco CA (USA) Apress) <<http://www.apress.com/book/bookDisplay.html?bID=342>>.

Annex II

Accessible Information and Communications Technologies (ICT): selected references

A. Selected definitions

1. International policy basis. Rule 5 (Accessibility) of the United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities¹ currently is the sole source of international policy guidance on environmental accessibility.

Rule 5 – Accessibility - states:

States should recognize the overall importance of accessibility in the process of the equalization of opportunities in all spheres of society. For persons with disabilities of any kind, States should (a) introduce programmes of action to make the physical environment accessible; and (b) undertake measures to provide access to information and communication.

a. Access to the physical environment

States should initiate measures to remove the obstacles to participation in the physical environment.

Such measures should be to develop standards and guidelines and to consider enacting legislation to ensure accessibility to various areas in society, such as housing, buildings, public transport services and other means of transportation, streets and other outdoor environments.

States should ensure that architects, construction engineers and others who are professionally involved in the design and construction of the physical environment have access to adequate information on disability policy and measures to achieve accessibility.

Accessibility requirements should be included in the design and construction of the physical environment from the beginning of the designing process.

Organizations of persons with disabilities should be consulted when standards and norms for accessibility are being developed. They should also be involved locally from the initial planning stage when public construction projects are being designed, thus ensuring maximum accessibility.

b. Access to information and communication

Persons with disabilities and, where appropriate, their families and advocates should have access to full information on diagnosis, rights and available services and programmes, at all stages. Such information should be presented in forms accessible to persons with disabilities.

States should develop strategies to make information services and documentation accessible for different groups of persons with disabilities. Braille, tape services, large print and other appropriate technologies should be used to provide access to written information and documentation for persons with visual impairments. Similarly, appropriate technologies should be used to provide access to spoken information for persons with auditory impairments or comprehension difficulties.

Consideration should be given to the use of sign language in the education of deaf children, in their families and communities. Sign language interpretation services should also be provided to facilitate the communication between deaf persons and others.

Consideration should also be given to the needs of people with other communication disabilities.

States should encourage the media, especially television, radio and newspapers, to make their services accessible.

States should ensure that new computerized information and service systems offered to the general public are either made initially accessible or are adapted to be made accessible to persons with disabilities.

Organizations of persons with disabilities should be consulted when measures to make information services accessible are being developed.

2. Functional definition. The “Manila Declaration on Accessible Information and Communications Technologies (ICT)”² which was adopted at the United Nations Interregional Seminar and Regional Demonstration Workshop on Accessible ICT and Persons with Disabilities, Manila, Philippines (3-7 March 2003)³ recognized accessibility “as an essential component of broad rights-based approaches to development”.

The Declaration states “Access to the physical environment and access to information and communications impact the full scope of social life and development for all and can promote equality and opportunities for full participation for everyone.”

“Operationally, accessible ICT ... provides the flexibility to accommodate the needs and preferences of the widest range of users.

“The value proposition of accessible ICT ... is equality through inclusive solutions based on full and effective participation.”

The Declaration notes “ICT is a member of the larger set of electronic and information technology products, equipment systems and services that store, process, transmit, convert, duplicate or receive digital information. Electronic and information technology products include photocopiers, computers, personal digital assistants (PDAs), facsimile machines, information transaction machines or kiosks, automatic transaction machines (ATMs), voting machines, operating systems, software (including application generators and development tools), Web sites, public mass media (radio, television and cinema) and telecommunications systems and devices” . . . which should all “provide accessibility with reasonable accommodation..”

3. Substantive contributions to elaboration of an international convention to promote and protect the rights and dignity of persons with disabilities.

(a) The “Bangkok Draft - Proposed Elements for a Comprehensive and Integral International Convention to Promote and Protect the Rights and Dignity of Persons with Disabilities”⁴ which was formulated by the United Nations Regional Workshop towards a Comprehensive and Integral International Convention on Protection and Promotion of the Rights and Dignity of Persons with Disabilities (Bangkok, 14-17 October 2003)⁵ contains proposed text on “accessibility” for consideration in the elaboration of the international convention:

“Bangkok Draft Article 16 - Accessibility

“1. States Parties recognize the right of persons with disabilities to access the physical environment, public transportation and information and communication, including information, communication and assistive technologies, and shall take progressive measures, including through the development of detailed national standards, to ensure their freedom, independence and full participation in all aspects of life, especially in relation to access to:

- a. Public buildings, roads and facilities for public usage;
- b. Public transportation facilities and services;

- c. Public housing and facilities, or those built or renovated with public funds. Private sectors shall be encouraged to take accessibility into consideration when they build or renovate housing or facilities;
- d. Public and private sector services, particularly health and education services;
- e. Employment and workplaces;
- f. Information and communication services including, for example, telecommunications, electronic banking and the mass media;

“2. States Parties should encourage the research, development and promotion of new technologies to assist in the promotion of persons with disabilities in all aspects of life.”

(b) “Draft articles for a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities”⁶ prepared by the Working Group of the Ad Hoc Committee on a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities, which met in New York from 5-16 January 2004, provides the following text on accessibility:

“Draft Article 19 - ACCESSIBILITY

“1. States Parties to this Convention shall take appropriate [66] measures to identify and eliminate obstacles, and to ensure accessibility for persons with disabilities to the built [67] environment, to transportation, to information and communications, including information and communications technologies, and to other services, [68] in order to ensure the capacity of persons with disabilities to live independently and to participate fully in all aspects of life. The focus of these measures shall include, inter alia:

- a. the construction and renovation of public[69] buildings, roads and other facilities for public use, including schools, housing, medical facilities, in-door and out-door facilities and publicly owned workplaces;
- b. the development and remodelling of public transportation facilities, communications and other services, including electronic services.

“2. States Parties shall also take appropriate measures to:

- a. provide in public buildings and facilities signage in Braille and easy to read and understand forms;
- b. provide other forms of live assistance [70] and intermediaries, [71] including guides, readers and sign language interpreters, to facilitate accessibility to public buildings and facilities;
- c. develop, promulgate and monitor implementation of minimum national standards and guidelines for the accessibility of public facilities and services;
- d. encourage private entities that provide public facilities and services to take into account all aspects of accessibility for persons with disabilities;
- e. undertake and promote research, development and production of new assistive technologies, giving priority to affordably priced technologies;
- f. promote universal design and international cooperation in the development of standards, guidelines and assistive technologies;
- g. ensure organisations of persons with disabilities are consulted when standards and guidelines for accessibility are being developed;
- h. provide training for all stakeholders on accessibility issues facing persons with disabilities.

“Footnotes:

“[66]: Some members of the Working Group preferred the word "progressive" in this paragraph and in the chapeau of paragraph 2. Other members were concerned with consistency with other articles of the Convention. The Ad Hoc Committee may wish to consider alternative formulations.

“[67]: The Ad Hoc Committee may wish to consider whether the term "physical" should be used instead of "built", which is its near synonym in this context.

“[68]: The Ad Hoc Committee may wish to consider further the issue of attempting to list comprehensively the facilities and services covered in the chapeau to this paragraph, including whether a reference to the "communications environment" is desirable.

“[69]: The Ad Hoc Committee may wish to consider the scope of the provisions in this draft article, in particular paragraphs 1(a) and (b), and 2(a), (b), (c) and (d). The Working Group questioned whether the concept of public buildings, facilities and services should also extend to privately owned or developed buildings, facilities and services intended for public use, and what level of obligation States Parties should place on private owners or developers to ensure access to persons with disabilities. Some members of the Working Group were of the view that privately owned or developed buildings, facilities and services should be covered by the obligations in this draft Article, but other members wished to consider the implications of this further.

“[70]: 'Live assistance' includes human assistance, such as guides and readers, and animal assistance, such as guide dogs. The Ad Hoc Committee may wish to consider whether there is a more self-explanatory term. The term is also used in draft Article 20(a) [Personal Mobility].

“[71]: 'Intermediaries' means people who do not assist but who rather act as a conduit for the transmission of information to certain groups of persons with disabilities, for example, sign language interpreters for the hearing impaired. The term is also used in draft Article 20(a) [Personal Mobility].”

The draft text of the convention prepared by the Working Group will be considered by the Ad Hoc Committee from its third session scheduled for 24 May to 4 June 2004 in New York.

B. Selected Standards

1. Web Content Accessibility Guidelines (WCAG) 2.0 (working draft).⁷ The Web Content Accessibility Guidelines, WCAG 1.0,⁸ were first published in 1999 by the World Wide Web Consortium (W3C),⁹ a private non-profit organization, as recommended design principles for creating accessible Web content. The current draft, WCAG 2.0, provides a comprehensive and extensive presentation of concepts that apply to all Web-based content. Their design principles are not specific to HTML,¹⁰ XML,¹¹ or any other technology so that they could be applied to a variety of situations and technologies, including those that do not yet exist.

WCAG 2.0 (working draft) presents non-technology-specific guidelines, success criteria (normative) and definitions, benefits and examples (non-normative) for each guideline, and an appendix containing definitions, references and other support information.

WCAG 2.0 (draft) is based on four design principles:

1. Content must be perceivable;
2. Interface elements in the content must be operable;
3. Content and controls must be understandable;
4. Content must be robust enough to work with current and future technologies.

Since WCAG 2.0 has the status of “working draft”, the W3C has not yet published a technical checklist for design of accessible Web content; the current checklist is based on WCAG 1.0.¹²

2. Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220). Electronic and Information Technology of the United States. Section 508 requires United States Federal agencies to provide people with disabilities with access to their electronic and information technologies access to information that is comparable to access available to others. Section 508 was enacted to eliminate barriers in information technology, to make available new opportunities for people with disabilities, and to encourage development of technologies that will help achieve these goals.

Section 508 includes technical standards and performance-based requirements related to various technologies, which include:

- a. software applications and operating systems;
- b. Web-based information or applications;
- c. telecommunication products;
- d. video and multimedia products;
- e. self contained, closed products (e.g., information kiosks, calculators, and fax machines);
- f. desktop and portable computers.¹³

3. "Manila Accessible Information and Communications Technologies (ICT) Design Recommendations".¹⁴ The Manila Accessible ICT Design Recommendations were formulated by the United Nations Interregional Seminar and Regional Demonstration Workshop on Accessible ICT and Persons with Disabilities, Manila, Philippines (3-7 March 2003) with the aim of providing countries with a critical minimum checklist for the design and development of accessible Web content.

The normative basis of the Manila Accessible ICT Design Recommendations is Rule 5 (Accessibility) of the Standard Rules.

The conceptual basis of the Manila Accessible ICT Design Recommendations is Universal Design¹⁵ in the light of its focus on designs that meet the needs of diverse users through inclusive solutions and open and democratic participation. Accessible ICT designs based on universal concepts provide for flexibility to accommodate those who operate in low bandwidth settings, use cell phones to synthesize text and may access the Internet or use other electronic appliances by means of alternative devices.

The Manila Accessible ICT Design Recommendations identify five considerations when designing for accessibility with reasonable accommodation:

- a. Content is organized and presented appropriate to the interests, needs and preferences of end users;
- b. Aesthetics of the design accommodate the needs and preferences of diverse users;
- c. Accessibility of the design benefits all users as well as users with special needs;
- d. Usability¹⁶ of the design allows users to access, navigate, search and leave the information resource easily, intuitively and without barriers;
- e. Sustainability of the design is based on content management that affords flexibility to accommodate needs and preferences of diverse users.

The "Manila Accessible ICT Design Recommendations" are based on the premise that accessibility is achieved easily and efficiently with the application of "first principles" of accessibility:

1. Every visual element should be implemented with a textual element that describes it. Alternative text <alt> allows for description of graphical images.
2. The structure and layout of the document should be dealt with separately. Structure is defined by HTML (Hypertext Markup Language) elements and attributes; and layout is defined by style sheets. Separation of layout from content aids text browsers to extract easily the logical structure of the document.¹⁷

The "Manila Accessible ICT Design Recommendations" address the issue of barriers in Web-based information goods and services by identifying a select set of "electronic curb cuts"¹⁸ to provide flexibility to accommodate each user's needs and preferences. Seven points are identified:

- a. Provide an Access Instruction page for visitors (explaining the accessibility features of the Web site and providing an e-mail hyperlink for visitors to communicate problems with Web page accessibility);
- b. Provide support for text browsers and descriptive hyperlinks (links such as "this" and "click here" do not alone convey the nature of the target link);

- c. Attach ALT<alt> (alternative) text to graphic images so that assistive computer technology such as screen readers can reach the content;
- d. For each photographic image that contributes meaningful content to the page, provide a "D" hyperlink to a page that provides descriptive text of the image;
- e. Provide text transcriptions or descriptions for all audio and video clips;
- f. Provide alternative mechanisms for online forms since forms are not supported by all browsers (such as e-mail or voice/TTY phone numbers);
- g. Avoid access barriers, such as the posting of documents in Adobe® PDF (Portable Document Format), non-linear format, Frame format or requiring visitors to download software to access the content. If posting in Adobe® PDF, accessible HTML (Hypertext Markup Language) or ASCII text must also be posted by the Web master converting the document.¹⁹

In the light of the rapid changes in the field of information and communications technologies, the Manila Accessible ICT Design Recommendations are “under construction” better to promote accessibility for all.

C. Selected Online Resources to Test and Evaluate Accessible ICT

Two types of validation tools are available online: those which validate Hypertext Markup Language (HTML) and those which do automated accessibility checks.

“HyperText Markup Language (HTML) validators are Standard Generalized Markup Language (SGML) Parsers that check the mark-up language of a Web page against its document-type definition (DTD). A DTD for a Web page is listed before the <html> tag in the source code and defines the type of HTML being used and the mark-up tags that can be employed within the page. HTML validators can tell users whether or not their code is valid or invalid.

“In contrast to HTML validators, accessibility tools cannot tell users whether or not their Web pages are completely accessible or inaccessible. All accessibility tools scan the source code of a Web page using interpretations of either the United States Rehabilitation Act Section 508 standards and/or the World Wide Web Consortium's Web Content Accessibility Guidelines 1.0 (WCAG). These tools help can help individuals spot glaring accessibility errors and remind users of accessibility issues that require manual checks.”²⁰

1. WorldEnable Accessibility Validator < <http://www.worldenable.net/wevalidator.htm>>

The WorldEnable Validator is a technical implementation of the Manila Accessible ICT Design Recommendations (March 2003), which represents the first set of threshold level functional specifications that may be used as a basis for accessibility standards in countries. The Validator provides guidance on making a Web design accessible as set forth in the Manila Design Recommendations.

2. CynthiaSays® Section 508 Validator < http://www.icdri.org/test_your_site_now.htm>.

The CynthiaSays® Validator is a Web content accessibility validation solution, which is designed to identify errors in design related to Section 508 standards as well as the WCAG guidelines.

3. W3C MarkUp Validation Service < <http://validator.w3.org/>>.

The W3C MarkUp Validation Service checks documents like HTML and XHTML for conformance to W3C Recommendations and other standards.

The following governmental sites are based on W3C WCAG 1.0 Recommendations:

- a. Australia - Guide to Minimum Web Site Standards – Accessibility (3/04/04)
<<http://www.agimo.gov.au/practice/mws/accessibility>>.

The Australia Guide states “the standard for web content accessibility is the *Web Content Accessibility Guidelines*, which were devised by the World Wide Web Consortium (W3C) <www.w3.org/tr/wai-webcontent>.

- b. Canada – Common Look and Feel (CLF) for the Internet resources page
<http://www.cio-dpi.gc.ca/clf-nsi/index_e.asp>.

The CLF standards are designed to ensure that all Canadians, regardless of ability, geographic location or demographic category, are given equal access to information on Government of Canada (GoC) Web sites. The CLF standards provide that all GoC Web sites comply with W3C Priority 1 and Priority 2 checkpoints to ensure sites can be easily accessed by the widest possible audience <http://www.cio-dpi.gc.ca/clf-nsi/stndrds-normes/stndrds-normes_e.asp> .

- c. European Commission: e-Accessibility: Web and People with Disabilities
<http://europa.eu.int/information_society/topics/citizens/accessibility/web/index_en.htm>

EC Communication “eEurope 2002: Accessibility of Public Web Sites and their Content”, adopted on 25 September 2001, states that ensuring availability of accessible public Web sites and their content will be furthered by adoption by the 15 EU member states of the Web Accessibility Initiative (WAI) Guidelines (WCAG 1.0) for public Web sites by the end of 2001.²¹

- d. United Kingdom of Great Britain and Northern Ireland: Guidelines for Government Web Sites: <<http://www.e-envoy.gov.uk/Resources/WebGuidelines/fs/en>>.

The Handbook states that Government Web sites should be user focused, engaging, accessible and usable; reference is made to W3C WAI guidelines and “Level A” compliance is recommended.²² The Handbook further states that WAI compliance does not ensure usability, i.e. ease of use by intended audiences.

4. Non-governmental sites using W3C WCAG 1.0 and/or Section 508 Recommendations

- a. WAVE 3.0 <<http://www.wave.webaim.org/>>

WAVE 3.0 tests for both WCAG 1.0 and Section 508 compliance. It was produced and supported by WebAim (Web Accessibility In Mind), a private non-profit organization located at Utah State University (Utah) with the mission of improving accessibility to online learning opportunities for all people; in particular to improve accessibility for individuals with disabilities who currently may experience difficulties in obtaining access to online learning opportunities.

- b. Web Design Group HTML Validator <<http://www.htmlhelp.com/tools/validator/>>

The WDG is a private non-profit organization concerned with promoting the creation of non-browser Specific, non-resolution Specific, Creative and informative Web sites that are accessible to all users worldwide.

- c. Juicy Studio <<http://www.juicystudio.com/index.asp>>

Juicy Studio is a private site with the mission of promoting best practice for Web developers, and programmers and provides references to several online Web quality assurance tools:

- Readability Test - The readability test analyses a Web page to determine how readable it is.
<<http://www.juicystudio.com/fog/>>
- Link Analyser - The link analyser tests Web pages for broken links.
<<http://www.juicystudio.com/services/linktest.asp>>
- Image Analyser - The image analyser tests Web pages to ensure that images have been specified properly. <<http://www.juicystudio.com/services/image.asp>>

- CSS Accessibility Analyser - The CSS accessibility analyser checks CSS files for potential accessibility issues. The service allows you to check CSS directly, a resource on the Web, or upload a file from your machine. < <http://www.juicystudio.com/services/csstest.asp>>
 - Colour Contrast Analyser - The colour contrast analyser tests whether the contrast between background and foreground is sufficient.
<<http://www.juicystudio.com/services/colourcontrast.asp>>
- d. Torquemada [Italian and English] < http://www.webxtutti.it/testa_en.htm>.
- Torquemada* provides an online methodology for accessibility analysis that uses a tool for page checking so that it is possible to quickly identify which parts of a page are in error and the HTML code corresponding to these parts.
- e. WebXACT < <http://webxact.watchfire.com/>>
- WebXACT, supported by Watchfire, a private-sector corporation located at Kanata, Ontario (Canada), provides free online analyses of single pages of Web content for quality and accessibility in accordance with WCAG 1.0 and Section 508 recommendations; it can test for privacy issues as well.
- f. Web Page Analyzer 0.82 <<http://www.websiteoptimization.com/services/analyze/>>
- Web Page Analyzer, supported by Web Site Optimization, LLC a private-sector firm located at Ann Arbor MI (USA), is a free online quality assurance tool that tests Web site complexity and load speeds over a variety of connection options from dialup modem to high-speed Internet connections.

D. Selected Online Technical Resources

1. Internet Accessibility; a primer: Accessibility on the Internet
<<http://www.un.org/esa/socdev/enable/disacc00.htm>>.

The Internet Accessibility primer was produced in connection with the Internet accessibility pilot project of the Division for Social Policy and Development of the United Nations Secretariat during the period 1999-2000. The primer is maintained and updated periodically by the WorldEnable consortium²³ in line with its mission of promoting Internet Accessibility for all.

2. Microsoft Accessibility: technology for everyone <<http://www.microsoft.com/enable/>>.
3. Microsoft Developers Network: resources on accessibility
<<http://msdn.microsoft.com/library/default.asp?url=/nhp/default.asp?contentid=28000544>>.

Microsoft® Active Accessibility 2.0 is a COM-based technology that improves the way accessibility aids work with applications running on Microsoft Windows operating systems.

4. Apple Computer Corporation: Accessibility technologies in MAC OS X
<<http://www.apple.com/accessibility/>>.
5. Linux: Accessibility Issues <<http://www.linux.org/>>.

Linux is a free Unix-type operating system - also called GNU General Public License Linux²⁴ - which is being used on servers and on an increasing number of desktop computers. Researchers have noted a lack of accessibility tools and infrastructure for graphical user interfaces (GUI) and graphical desktops on Linux.²⁵

- a. GNOME Accessibility Project <<http://developer.gnome.org/projects/gap/>>.

The Project focuses on improving accessibility features of the Unix-based GNOME Linux desktop environment,²⁶ which includes creating a screen reader, Braille output software, and on-screen keyboard. The project also has created the GNOME Accessibility Architecture,²⁷ which integrates these three tools and many other pre-existing third party ones.

- b. Linux Accessibility Resources Site (LARS) <<http://lars.atrc.utoronto.ca/>>.

LARS is hosted and supported by the Adaptive Technology Resource Centre (ATRC) at the University of Toronto (CA) in cooperation with the Trace Research and Development Center at the University of Wisconsin (USA) and the global Linux accessibility movement for the purpose of providing tools and resources on making the Linux / Unix environment accessible and usable for all.

E. Selected Online Training and Educational Resources

1. Access IT – National Center on Accessible Information Technology in Education of the University of Washington (USA) <<http://www.washington.edu/accessit/about.php>>.

The Access IT mission is to increase the access of individuals with disabilities to information technology in educational institutions at all academic levels. Access IT maintains an online knowledge base on accessible information technology in education and provides training and related activities.

2. BrailleNet.Org <<http://brailenet.org/>>.

Mission: une porte sur le Web pour les personnes handicapées visuelles.

- a. L'accessibilité du Web <<http://brailenet.org/accessibilite/>> [French / English].
- b. Livre blanc du BrailleNet - Le WEB plus accessible pour les aveugles et malvoyants <<http://brailenet.org/accessibilite/livreblanc/index.html>> [French / English / German / Spanish].
- c. VoirPlus - Le portail au service des personnes handicapées visuelles. <<http://www.voirplus.net/>>.
- d. Accessiweb - Centre de ressources et de recherche sur l'accessibilité du Web <http://www.accessiweb.org/fr/Accessibilite_du_web/>.

3. Accessibility guide <http://www.usablenet.com/accessibility_usability/accessibility.html>

4. Usability guide <http://www.usablenet.com/accessibility_usability/usability.html>.

5. AnyBrowser.Com <<http://www.anybrowser.com/>>.

Mission: provide online Web design resources, tutorials and quality assurance tools.

6. AWARE Center of the HTML Writers Guild <<http://www.hwg.org>> - AWARE: Accessible Web Authoring Resources and Education Center <<http://aware.hwg.org/>>.

Mission: serve as a resource for Web authors who want learn about Web accessibility. The HTML Writers Guild established AWARE Center in 1999 to promote awareness of the importance of designing for universal accessibility and provide resources for Web authors for the design of accessible Web sites.

7. Dive Into Accessibility – Online guide to accessible Web design <<http://diveintoaccessibility.org/>>.

The online training guide addresses two issues: (1) why should one make a web site more accessible; and (2) how can one make a web site more accessible. The guide is based on the premise that designing an accessible site does involve complex technical issues or introduce design constraints. Accessible Web design increases the clarity of Web content and browsing becomes easier and more intuitive. For instance, the use of style sheets²⁸ improves Web accessibility by efficiently separating layout from content issues, which also allows for more time to devote to design, development and maintenance of a Web site.”

8. WebAIM – Web Accessibility in Mind of the Center for Persons with Disabilities at Utah State University (USA) < <http://www.webaim.org/>>.

- Introduction to Web Accessibility <<http://www.webaim.org/intro/>>.
- Evaluating Web Site Accessibility < <http://www.webaim.org/techniques/evaluating/>>.
- Review of Free, Online Accessibility Tools
<<http://www.webaim.org/techniques/articles/freetools/>>.

N.B. References to products and registered trademarks, which are the property of the respective owner(s), are for information purposes only and do not constitute endorsement.

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Notes

¹ United Nations General Assembly resolution 48/96, annex, of 20 December 1993
<<http://www.un.org/esa/socdev/enable/dissre00.htm>>.

² <<http://www.worldeable.net/manila2003/declaration.htm>>.

³ <<http://www.worldeable.net/manila2003/Default.htm>>.

⁴ <<http://www.worldeable.net/bangkok2003a/bangkokdraftrev.htm>>.

⁵ <<http://www.worldeable.net/bangkok2003a/>>.

⁶ Report of the Working Group to the Ad Hoc Committee (A/AC.265/2004/WG/1)
<<http://www.un.org/esa/socdev/enable/rights/ahcwgreport.htm>>.

⁷ <<http://www.w3.org/TR/2004/WD-WCAG20-20040311/>>.

⁸ <<http://www.w3.org/TR/WCAG10/>>.

⁹ <<http://www.w3c.org/>>.

¹⁰ Hypertext Markup Language is *lingua franca* for publishing hypertext content on the World Wide Web; the current standard is HTML 4.01 <<http://www.w3.org/TR/html4/>>.

¹¹ Extensible Markup Language is *lingua franca* for data representation on the World Wide Web. The XML Core Working Group publishes recommendations, some of which are still drafts, on XML, which include XML 1.0 (Third Edition) and XML 1.1
<<http://www.w3.org/XML/Core/#Publications>>.

¹² *List of Checkpoints for Web Content Accessibility Guidelines 1.0* <<http://www.w3.org/TR/WCAG10/checkpoint-list.html>>.

Priorities

Each checkpoint has a priority level assigned by the Working Group based on the checkpoint's impact on accessibility.

[Priority 1]

A Web content developer must satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use Web documents.

[Priority 2]

A Web content developer should satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing Web documents.

[Priority 3]

A Web content developer may address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to Web documents.

Some checkpoints specify a priority level that may change under certain (indicated) conditions.

Priority 1 checkpoints

In General (Priority 1)

1.1 Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). This includes: images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.

2.1 Ensure that all information conveyed with color is also available without color, for example from context or markup.

4.1 Clearly identify changes in the natural language of a document's text and any text equivalents (e.g., captions).

- 6.1 Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.
- 6.2 Ensure that equivalents for dynamic content are updated when the dynamic content changes.
- 7.1 Until user agents allow users to control flickering, avoid causing the screen to flicker.
- 14.1 Use the clearest and simplest language appropriate for a site's content.
- And if you use images and image maps (Priority 1)
- 1.2 Provide redundant text links for each active region of a server-side image map.
- 9.1 Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
- And if you use tables (Priority 1)
- 5.1 For data tables, identify row and column headers.
- 5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.
- And if you use frames (Priority 1)
- 12.1 Title each frame to facilitate frame identification and navigation.
- And if you use applets and scripts (Priority 1)
- 6.3 Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.
- And if you use multimedia (Priority 1)
- 1.3 Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.
- 1.4 For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.
- And if all else fails (Priority 1)
- 11.4 If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.

Priority 2 checkpoints

In General (Priority 2)

- 2.2 Ensure that foreground and background color combinations provide sufficient contrast when viewed by someone having color deficits or when viewed on a black and white screen. [Priority 2 for images, Priority 3 for text].
- 3.1 When an appropriate markup language exists, use markup rather than images to convey information.
- 3.2 Create documents that validate to published formal grammars.
- 3.3 Use style sheets to control layout and presentation.
- 3.4 Use relative rather than absolute units in markup language attribute values and style sheet property values.
- 3.5 Use header elements to convey document structure and use them according to specification.
- 3.6 Mark up lists and list items properly.
- 3.7 Mark up quotations. Do not use quotation markup for formatting effects such as indentation.
- 6.5 Ensure that dynamic content is accessible or provide an alternative presentation or page.
- 7.2 Until user agents allow users to control blinking, avoid causing content to blink (i.e., change presentation at a regular rate, such as turning on and off).
- 7.4 Until user agents provide the ability to stop the refresh, do not create periodically auto-refreshing pages.
- 7.5 Until user agents provide the ability to stop auto-redirect, do not use markup to redirect pages automatically. Instead, configure the server to perform redirects.
- 10.1 Until user agents allow users to turn off spawned windows, do not cause pop-ups or other windows to appear and do not change the current window without informing the user.
- 11.1 Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported.
- 11.2 Avoid deprecated features of W3C technologies.
- 12.3 Divide large blocks of information into more manageable groups where natural and appropriate.
- 13.1 Clearly identify the target of each link.
- 13.2 Provide metadata to add semantic information to pages and sites.
- 13.3 Provide information about the general layout of a site (e.g., a site map or table of contents).
- 13.4 Use navigation mechanisms in a consistent manner.
- And if you use tables (Priority 2)
- 5.3 Do not use tables for layout unless the table makes sense when linearized. Otherwise, if the table does not make sense, provide an alternative equivalent (which may be a linearized version).
- 5.4 If a table is used for layout, do not use any structural markup for the purpose of visual formatting.
- And if you use frames (Priority 2)
- 12.2 Describe the purpose of frames and how frames relate to each other if it is not obvious by frame titles alone.
- And if you use forms (Priority 2)
- 10.2 Until user agents support explicit associations between labels and form controls, for all form controls with implicitly associated labels, ensure that the label is properly positioned.
- 12.4 Associate labels explicitly with their controls.
- And if you use applets and scripts (Priority 2)
- 6.4 For scripts and applets, ensure that event handlers are input device-independent.
- 7.3 Until user agents allow users to freeze moving content, avoid movement in pages.
- 8.1 Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies [Priority 1 if functionality is important and not presented elsewhere, otherwise Priority 2.]

- 9.2 Ensure that any element that has its own interface can be operated in a device-independent manner.
9.3 For scripts, specify logical event handlers rather than device-dependent event handlers.

Priority 3 checkpoints

In General (Priority 3)

- 4.2 Specify the expansion of each abbreviation or acronym in a document where it first occurs.
4.3 Identify the primary natural language of a document.
9.4 Create a logical tab order through links, form controls, and objects.
9.5 Provide keyboard shortcuts to important links (including those in client-side image maps), form controls, and groups of form controls.
10.5 Until user agents (including assistive technologies) render adjacent links distinctly, include non-link, printable characters (surrounded by spaces) between adjacent links.
11.3 Provide information so that users may receive documents according to their preferences (e.g., language, content type, etc.)
13.5 Provide navigation bars to highlight and give access to the navigation mechanism.
13.6 Group related links, identify the group (for user agents), and, until user agents do so, provide a way to bypass the group.
13.7 If search functions are provided, enable different types of searches for different skill levels and preferences.
13.8 Place distinguishing information at the beginning of headings, paragraphs, lists, etc.
13.9 Provide information about document collections (i.e., documents comprising multiple pages.).
13.10 Provide a means to skip over multi-line ASCII art.
14.2 Supplement text with graphic or auditory presentations where they will facilitate comprehension of the page.
14.3 Create a style of presentation that is consistent across pages.
And if you use images and image maps (Priority 3)
1.5 Until user agents render text equivalents for client-side image map links, provide redundant text links for each active region of a client-side image map.
And if you use tables (Priority 3)
5.5 Provide summaries for tables.
5.6 Provide abbreviations for header labels.
10.3 Until user agents (including assistive technologies) render side-by-side text correctly, provide a linear text alternative (on the current page or some other) for all tables that lay out text in parallel, word-wrapped columns.
And if you use forms (Priority 3)
10.4 Until user agents handle empty controls correctly, include default, place-holding characters in edit boxes and text areas.
¹³ Guide to the Section 508 Standards for Electronic and Information Technology <<http://www.access-board.gov/sec508/guide/index.htm>>.

Overview of Technical Standards (Subpart B)

The standards provide criteria specific to various types of technologies, including:

- software applications and operating systems
- web-based information or applications
- telecommunication products
- video and multimedia products
- self contained, closed products (e.g., information kiosks, calculators, and fax machines)
- desktop and portable computers

Software Applications and Operating Systems (1194.21)

Most of the specifications for software pertain to usability for people with vision impairments. For example, one provision requires alternative keyboard navigation, which is essential for people with vision impairments who cannot rely on pointing devices, such as a mouse. Other provisions address animated displays, color and contrast settings, flash rate, and electronic forms, among others.

Web-based Intranet and Internet Information and Applications (1194.22)

The criteria for web-based technology and information are based on access guidelines developed by the Web Accessibility Initiative of the World Wide Web Consortium. Many of these provisions ensure access for people with vision impairments who rely on various assistive products to access computer-based information, such as screen readers, which translate what's on a computer screen into automated audible output, and refreshable Braille displays. Certain conventions, such as verbal tags or identification of graphics and format devices, like frames, are necessary so that these devices can "read" them for the user in a sensible way. The standards do not prohibit the use of web site graphics or animation. Instead, the standards aim to ensure that such information is also available in an accessible format. Generally, this means use of text labels or descriptors for graphics and certain format elements. (HTML code already provides an "Alt Text" tag for graphics which can serve as a verbal descriptor for graphics). This section also addresses the usability of multimedia presentations, image maps, style sheets, scripting languages, applets and plug-ins, and electronic forms.

The standards apply to Federal web sites but not to private sector web sites (unless a site is provided under contract to a Federal agency, in which case only that web site or portion covered by the contract would have to comply). Accessible sites offer significant advantages that go beyond access. For example, those with "text-only" options provide a faster downloading alternative and can facilitate transmission of web-based data to cell phones and personal digital assistants.

Telecommunications Products (1194.23)

The criteria of this section are designed primarily to ensure access to people who are deaf or hard of hearing. This includes compatibility with hearing aids, cochlear implants, assistive listening devices, and TTYs. TTYs are devices that enable people with hearing or speech impairments to communicate over the telephone; they typically include an acoustic coupler for the telephone

handset, a simplified keyboard, and a visible message display. One requirement calls for a standard non-acoustic TTY connection point for telecommunication products that allow voice communication but that do provide TTY functionality. Other specifications address adjustable volume controls for output, product interface with hearing technologies, and the usability of keys and controls by people who may have impaired vision or limited dexterity or motor control.

Video or Multimedia Products (1194.24)

Multimedia products involve more than one media and include, but are not limited to, video programs, narrated slide production, and computer generated presentations. Provisions address caption decoder circuitry (for any system with a screen larger than 13 inches) and secondary audio channels for television tuners, including tuner cards for use in computers. The standards also require captioning and audio description for certain training and informational multimedia productions developed or procured by Federal agencies. The standards also provide that display or presentation of alternate text or audio descriptions shall be user-selectable unless permanent.

Self Contained, Closed Products (1194.25)

This section covers products that generally have imbedded software but are often designed in such a way that a user cannot easily attach or install assistive technology. Examples include information kiosks, information transaction machines, copiers, printers, calculators, fax machines, and similar types of products. The standards require that access features be built into the system so users do not have to attach an assistive device to it. Other specifications address mechanisms for private listening (handset or a standard headphone jack), touchscreens, auditory output and adjustable volume controls, and location of controls in accessible reach ranges.

Desktop and Portable Computers (1194.26)

This section focuses on keyboards and other mechanically operated controls, touch screens, use of biometric form of identification, and ports and connectors.

Functional Performance Criteria (Subpart C)

The performance requirements of this section are intended for overall product evaluation and for technologies or components for which there is no specific requirement under the technical standards in Subpart B. These criteria are designed to ensure that the individual accessible components work together to create an accessible product. They cover operation, including input and control functions, operation of mechanical mechanisms, and access to visual and audible information. These provisions are structured to allow people with sensory or physical disabilities to locate, identify, and operate input, control and mechanical functions and to access the information provided, including text, static or dynamic images, icons, labels, sounds or incidental operating cues.

Information, Documentation, and Support (Subpart D)

The standards also address access to all information, documentation, and support provided to end users (e.g., Federal employees) of covered technologies. This includes user guides, installation guides for end-user installable devices, and customer support and technical support communications. Such information must be available in alternate formats upon request at no additional charge. Alternate formats or methods of communication, can include Braille, cassette recordings, large print, electronic text, Internet postings, TTY access, and captioning and audio description for video materials.

¹⁴ < <http://www.worldenable.net/manila2003/DesignRecommendations.htm> >.

¹⁵ Universal Design is based on seven principles: (1) Equitable use - the design is useful and relevant to a wide group of users; (2) Flexibility in use - the design accommodates a wide range of individual preferences and abilities; (3) Simple and intuitive use - the design is easy to understand regardless of the knowledge, experience, language skills or concentration level of the user; (4) Perceptive information - the design communicates information effectively to the user regardless of the ambient condition or the sensory abilities of the user; (5) Tolerance for error - the design minimises the hazards and adverse consequences of unintended actions of the user; (6) Low physical effort - the design can be used easily, efficiently and comfortably with a minimum of fatigue; and (7) Size and space for approach and use - the size and space for approach, reach, manipulation and use should be appropriate regardless of the body size, posture or mobility of the user. See "Report" of International Seminar on Environmental Accessibility; planning and design of accessible urban development in developing countries (Beirut, 30 November - 3 December 1999) <<http://www.un.org/esa/socdev/enable/disisea3.htm>>. The following premises are associated with Universal Design: (a) varying ability is not a special condition of the few but a common characteristic of being human and we change physically and intellectually throughout our lives; (b) if a design works well for people with disabilities, it works better for everyone; (c) at any point in our lives, personal self-esteem, identity, and well-being are deeply affected by our ability to function in our physical surroundings with a sense of comfort, independence and control; and (d) usability and aesthetics are mutually compatible < <http://www.adaptenv.org/universal/index.php> >.

¹⁶ "Usability" refers to the quality of a user's experience when interacting with a product or system — whether a Web site, a software application, mobile technology, or any user-operated device.

Several factors can affect the user's experience with a product or system, which include:

1. Ease of learning: How fast can a user who has never seen the user interface before learn it sufficiently well to accomplish basic tasks?
2. Efficiency of use: Once an experienced user has learned to use the system, how fast can he or she accomplish tasks?
3. Memorability: If a user has used the system before, can he or she remember enough to use it effectively the next time or does the user have to start over again learning everything?
4. Error frequency and severity: How often do users make errors while using the system, how serious are these errors, and how do users recover from these errors?
5. Subjective satisfaction: How much does the user like using the system? See *Usability Basics*

<<http://www.usability.gov/basics/index.html>>.

¹⁷ < <http://www.brailenet.org/accessiblite/livreblanc/english/accessiblite.html> >.

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- ¹⁸ Cynthia D. Waddell, JD. "The Growing Digital Divide in Access for People with Disabilities: overcoming barriers to participation" (1999), p. 2 at < http://www.icdri.org/CynthiaW/the_digital-divide.htm >.
- ¹⁹ Cynthia D. Waddell, "Overview of Law and Guidelines," Chap. 2 in Jim Thatcher et al., *Constructing Accessible Web Sites*, (Birmingham (UK) Glasshaus, 2002), republished July 2003 (San Francisco CA (USA) Apress)
<<http://www.apress.com/book/bookDisplay.html?bID=342>>.
- ²⁰ Peter Blake, "A Review of Free, Online Accessibility Tools" (February 2004)
<<http://www.webaim.org/techniques/articles/freetools/>>.
- ²¹ European Commission, "Information Providers Guidelines" < http://europa.eu.int/comm/ipg/index_en.htm>. "The EUROPA site must be accessible to the largest possible number of users" in "7 – Accessibility"
<http://europa.eu.int/comm/ipg/rule7/rule7_en.htm>.
- ²² See UK *Web Handbook*, Chapter 2 "Content of WebSites", section 2. 4 - Building in universal accessibility + checklist
<http://www.e-envoy.gov.uk/Resources/WebHandbookIndex1Article/fs/en?CONTENT_ID=4000092&chk=XHiT3L>.
- ²³ < <http://www.worldenable.net/about.htm>>.
- ²⁴ <<http://www.linux.org/info/gnu.html>>.
- ²⁵ "Is Linux accessible?" <<http://www.washington.edu/accessit/articles?13>>.
- ²⁶ < <http://www.gnome.org/about/>>.
- ²⁷ < <http://developer.gnome.org/projects/gap/GNOME-Accessibility.html> >.
- ²⁸ Web Design Group, "Guide to Cascading Style Sheets" <<http://www.htmlhelp.com/reference/css/>> [English / Chinese / Japanese / Spanish].

Annex III

Internet accessibility: a select review of pilot action by the United Nations*

I. OVERVIEW

This paper examines the role of accessibility in furthering an international policy objective: equalization of opportunities by, for and with persons with disabilities.¹ It will review and discuss pilot action by the Division for Social Policy and Development of the United Nations Secretariat to promote awareness and build national capacities for Internet accessibility. The concern of the Division with Internet accessibility derives both from its role as “focal point for disability issues within the United Nations system”² and mandates of the General Assembly, which identified accessibility as the priority in the design of social and economic policies aimed at equalization of opportunities for persons with disabilities.³

A review of activities by the United Nations system concerning Internet accessibility is beyond the scope of this paper.

The implications of information and communications technologies (ICT) for development were considered by the year 2000 “High level segment” of the Economic and Social Council of the United Nations, which adopted a “Ministerial Declaration”⁴ that noted that the “potential [of ICT to advance] development has not been fully captured ... [and that] urgent and concerted actions ... are imperative for bridging the digital divide and building digital opportunities”. The “Declaration” further noted the potential of ICT to empower and to provide “unique opportunities for economic growth and human development”. The Declaration did not, however, address the question of accessible ICT for all in the context of development.

Internet accessibility and accessible ICT have in the main been identified with the Organization’s agenda related to advancement of persons with disabilities and development. Accessibility as an essential component of a broad human rights framework for development obtained added importance with the decision of the General Assembly, in 2001, to elaborate a “comprehensive and integral convention” to promote and protect the rights and dignity of persons with disabilities.⁵ General Assembly resolution 57/229, of 18 December 2002, on further work on elaboration of the convention “urge[d] that efforts be made to ensure that

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Note: Authors’ unedited text of chapter contributed to John Williams *et al* (2003). *Assistive Technologies: expanding a universe of opportunities* (Washington DC, Assistive Technology News and CTC Foundation) <<http://www.atn-ctcf.org/home.cfm>>.

accessibility, with reasonable accommodation as regards facilities and documentation, is improved for all persons with disabilities”.⁶

II. ACCESSIBILITY: POLICY OBJECTIVE AND TECHNICAL DESIGN CONSIDERATION

The Internet accessibility initiative of the Division for Social Policy and Development was carried out in response to mandates of the General Assembly on advancement of persons with disabilities and development. The international policy basis for Internet accessibility currently is limited to Rule 5 – Accessibility - of the non-binding “United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities,” adopted by the General Assembly in 1993.⁷ Rule 5 provides guidance on policy design and planning on environmental accessibility, which refers to both the physical environment and information and communications technologies. The decision of the General Assembly in 2001 to elaborate a new international convention on the rights of persons with disabilities has contributed to increased international awareness of accessibility as an essential component of a broad human rights framework for furthering full participation and equality of persons with disabilities in development. The rapid expansion of Internet-based services during the 1990s resulted in the adoption by a number of Governments of policies and legislation on accessible information and communications technologies, which include Australia, Canada, Denmark, European Union, Finland, France, Germany, India, Ireland, Italy, Japan, New Zealand, Portugal, Spain, United Kingdom and the United States of America.⁸

Operationally, pilot action at the United Nations defined “accessibility” as provision of “flexibility to accommodate each user’s needs and preferences”.⁹ some persons may need assistive technologies, such as screen magnifiers, screen readers or Braille interfaces to create, access and use information goods owing to a physical or sensorial disability, while others may need text-based or low-density graphical content due to limited telecommunications capacities (bandwidth) or level of information infrastructure to support complex graphical content, streaming audio and video content or proprietary document formats.¹⁰

Accessible information and communications goods and services are a technical concern of producers and users of information goods and services, since accessibility with reasonable accommodation is central to realization of full and effective participation by all in the new economics of development.¹¹ Those who argue that information technology has become commoditized¹² are focusing more on infrastructure issues than the instrumental role of information as (a) catalyst for change, (b) means to increase participation in decision-making and (c) factor driving re-engineering of organizational processes and procedures for sustainable and equitable development.¹³

III. STRATEGIC PLANNING FRAMEWORK FOR INTERNET ACCESSIBILITY FOR ALL

Formulation of a strategic planning framework, which involved extensive consultations with both staff of the Division and representatives of its specialized constituencies, was an essential component in the design, development, testing and evaluation of pilot action for introducing accessible Internet-based goods and services to work of the Division for Social Policy and Development of the United Nations Secretariat. The strategic planning framework presented for the consideration of the fifty-fourth session of the General Assembly in 1999 had five points, which are summarized below:¹⁴

(a) Vision: formulation of a shared vision for Internet accessibility initiative was important for building awareness and consensus for first principles of accessible design and for changes envisaged concerning the ways in which accessible social development information goods could be presented through Internet technologies. The vision statement identified provision of timely and relevant accessible social development information goods for all as the priority.

(b) Scope of pilot action and priorities: the time-frame for design, testing and implementation of an operational Internet site that met generally-accepted international standards for Web accessibility was tight, from February to May 1998, since pilot action would not only focus on provision of accessible information goods for persons with disabilities but on support for two priority observances in the social development field: the 1999 observance of the International Year of Older Persons, and preparations for the year 2000 special session of the General Assembly to consider progress in implementing the outcome of the World Summit for Social Development. Pilot action thus focused on Internet accessibility for all, with reference to priorities of the global social development programme of the United Nations, and to policies and programmes related to advancement of persons with disabilities and of older persons.

(c) Strategic components and feasibility: the time-frame for the Gateway initiative required pragmatic selection, evaluation, rapid application and evaluation of the best-available accessibility concepts, tools and procedures rather than comparative study and evaluation of new and emerging concepts, practices and technologies. For instance, the Microsoft Corporation provided in early 1998 a CD-ROM compilation of Internet accessibility design concepts and tools;¹⁵ the Opera Software Corporation provided complimentary copies of its Internet browser to support training in design, testing and evaluation of accessible Web design;¹⁶ and a great deal of open-source materials were identified on the Internet.¹⁷ Key references consulted included conceptual and technical studies on "electronic curb cuts",¹⁸ on usability concepts and guidelines,¹⁹ accessible Web development guidelines of the World Wide Web Consortium²⁰ and the "Bobby" online Web accessibility validator developed by the Center for Applied Special Technology.²¹ Since the Internet accessibility initiative of the Division was being implemented within the framework of the Internet site of the United Nations <<http://www.un.org>>, strategic components of pilot project on accessible Web pages were designed to be consistent with the Internet architecture of the United Nations Secretariat; which was possible due to excellent cooperation and support received from the Information Support Unit of the Department of Economic and Social affairs, which is the parent unit of the Division.²²

(d) Implementation strategy: the Internet accessibility initiative of the Division was outsourced to an international consultant team, with expertise in communications planning, Web design and training, since this would be the first case to plan, design and develop an Internet presence at the United Nations Secretariat on the basis of generally accepted standards for accessible Web design. Within two weeks of signing their contract for services, in March 1998, the team delivered an information assessment, content development strategy and prototype Web design for consideration of the Division for Social Policy and Development and an operational Internet presence was fully functioning ahead of the scheduled launch in May 1998.²³ The implementation strategy provided an institutional setting – uncommon in a large bureaucracy – that not only provided flexibility in decision

making but facilitated rapid prototyping, feedback and sharing of results. The implementation strategy that made effective use of the power of networks of specialists and interested constituencies for the work of the United Nations in the social development field and relied on information flows rather organizational hierarchies for decisions, which leveraged the knowledge and experiences of parties interested in Internet accessibility through the power of connectivity

(e) Monitoring and evaluation: the Internet accessibility pilot project had a tight schedule for design, testing and implementation of an operational accessible Internet presence. A critical task for the United Nations, represented by the Division for Social Policy and Development, and the international team was joint determination of milestones for conceptual design options, for delivery of content by the responsible substantive specialists, for Web page development and testing with agreed accessibility metrics, for coordination with the concerned technical services at the United Nations and for systematic feedback on design options from beta testers – invited and *ad hoc* -²⁴ representing the specialized constituencies for the global social development programme of the United Nations. For instance, a proposed design for the International Year of Older Persons Web site was positively critiqued by a concerned governmental representative, albeit with a reminder of the need for accessible language support. Critiques from persons with disabilities served to make the Persons with Disabilities Web site easy and efficient to navigate with text browsers. Design options were evaluated continually using on-line tools to assess compatibility with various Internet browsers, communications capacities and universal design principles.²⁵ The May 1998 delivery of the release candidate of an operational "Gateway for social policy and development" was accompanied by an intensive user orientation and training session to promote awareness of sustainable Web accessibility in the social development field.

IV. SELECTED ISSUES OF IMPLEMENTATION

The decision to initiate a pilot accessible Internet presence at the United Nations was taken in 1998, which was some three years after the United Nations Secretariat had established its Internet presence on the World Wide Web <<http://www.un.org>>. The challenge was to work within the established Internet presence of the Organization, which did not meet generally agreed standards for accessible Web pages, and to design and develop quickly and efficiently a presence that met generally agreed standards for Internet accessibility. While responding to mandates of the General Assembly on the critical role of accessibility in promoting equalization of opportunities by, for and with persons with disabilities, the value proposition of pilot action was defined as “best total solutions for all” and reflected the need to respond to the needs and interests of the various constituencies of the global social development programme of the United Nations.

“For all” was the central concern of the value proposition, since disability is a normal aspect of the life cycle and can affect anyone at any time.²⁶

Regular reports on progress, performance and accomplishments of pilot action in Internet accessibility were presented for the consideration of Governments in reports of the Secretary-General to the General Assembly²⁷ and the Commission for Social Development.²⁸ Efforts to promote awareness of Internet accessibility for all – as well as the larger set of accessible information and communications technologies (ICT) - as an essential component of development strategies, policies and plans included publication of technical reports and the organization of seminars and training workshops. The first of these efforts was publication, in mid-1998, of a

technical primer, "Accessibility on the Internet,"²⁹ which discusses technical design issues of the pilot project, includes selected (and periodically updated) reference materials and has become a recognized resource on the question. Training workshops, seminars and online dialogues on Internet accessibility with reasonable accommodation were planned and organized by the Division with the assistance of international experts in information policies, structures and technologies for United Nations Secretariat staff.³⁰ The Division organized a forum on "Internet Accessibility in the 21st Century (United Nations, 6 May 1999)"³¹ to present the results of its training in Internet accessibility to representatives of Permanent Missions and interested United Nations Secretariat staff members. H.E. Ambassador Felipe Mabilangan (Permanent Representative of the Republic of the Philippines) moderated the forum.

The positive reactions to Internet-related training at the United Nations and its May 1999 public forum resulted in the decision of some members of the international team that had assisted the Internet accessibility project of the Division for Social Policy and Development to establish the WorldEnable consortium to provide an international and multi-disciplinary institutional structure that could better assist and support initiatives of Governments as well as the non-governmental community in Internet accessibility.³²

With the growing awareness of role of accessible information and communications technologies in national development, a number of Governments requested assistance of the United Nations to organize seminars and workshops on Internet accessibility. The Division for Social Policy and Development supported several of these technical exchanges in cooperation with governmental departments, academic centres and institutions and the non-governmental community in Asia,³³ Central and Eastern Europe³⁴ and Latin America and the Caribbean.³⁵ These activities provided opportunities for policy makers, governmental officials, academics, Web designers and other ICT professionals, and members of civil society to exchange experiences, learn new concepts and techniques and create networks of excellence to promote accessibility with reasonable accommodation for all. Discussions currently are underway with the Division on expanding the experience to Africa, to the English-speaking Caribbean and to Western Asia.

Seminar and workshop materials were published in accessible formats on the WorldEnable Internet site <<http://www.worldenable.net>> so the training experiences would be accessible to a interested communities in addition to participants in the respective seminar and workshop.

Progress reports to concerned intergovernmental bodies of the United Nations enabled Governments to consider the relevance of the Internet accessibility initiative to their own development efforts. While each progress report resulted in strengthened mandate of the General Assembly on accessibility as a priority in strategies and policies to further equalization of opportunities,³⁶ support for accessibility with reasonable accommodation did not transmit substantially beyond the Organization's agenda related to advancement of persons with disabilities. The "Ministerial Declaration" of the year 2000 Economic and Social Council on information in a knowledge-based global economy makes no reference to accessibility among its recommendations on ICT and development. Similarly, none of the eight development goals elaborated in the

“Millennium Declaration” of the Millennium Assembly of the United Nations, which is the principal source of policy guidance on international development cooperation issues and priorities in the twenty first century, refer to advancement of persons with disabilities.³⁷

The decision of the General Assembly, in 2001,³⁸ to elaborate a new international convention on the rights of persons with disabilities, placed advancement of persons with disabilities on the global development agenda. The first session of the Ad Hoc Committee³⁹ established by the General Assembly to consider the elaboration of the convention made special reference to the importance of accessibility with reasonable accommodation and urged that efforts be taken to improve accessibility of United Nations facilities and documents.⁴⁰

In support of the convention process, the Division for Social Policy and Development retained the international presentation team of the WorldEnable consortium⁴¹ to design, develop and provide online support to technical exchanges related to the convention. The WorldEnable team initially provided support to an international expert meeting, organized by the United Nations and hosted by the Government of Mexico in June 2002 that considered options for the elaboration of a new convention and elements of a text.⁴² Given the considerable interest in the convention among the non-governmental disability community, expert meeting content and daily summaries were published in accessible formats on the Internet. Meeting support included accessible distance collaboration on convention issues, whose results were made available to the experts.⁴³ The Internet presence developed by the WorldEnable team, in cooperation with the Internet support team that supported and hosted the site for the Ministry of Foreign Affairs of the Government of Mexico, effectively promoted awareness of the outcome of the expert meeting and provided opportunities for interested parties to comment on that document.

General Assembly resolution 57/229, on further work on the convention, invited Governments to organize regional technical consultations. A number of these regional technical meetings were organized by the United Nations, represented by the Division for Social Policy and Development, in cooperation with interested Governments and partners in the United Nations system; Internet support for these meeting was designed, developed and hosted by the WorldEnable consortium on request. These meetings include: Government of Ecuador and the United Nations Development Programme Quito field office for the “Américas regional seminar and workshop on norms and standards related to the rights of persons with disabilities and development (Quito, 9-11 April 2003)”;⁴⁴ Government of the Republic of Lebanon and the United Nations Economic and Social Commission for Western Asia for the “Arab regional meeting on norms and standards related to development and the rights of persons with disabilities (Beirut, 27-29 May 2003)”;⁴⁵ and the United Nations Economic and Social Commission for Asia and the Pacific for the “Expert Group Meeting and Seminar on an International Convention to Protect and Promote the Rights and Dignity of Persons with Disabilities (Bangkok, 2-4 June 2003)”.⁴⁶ A key lesson of the experience is the importance of providing meeting content in accessible formats, in Arabic, English or Spanish, as appropriate, on the complex question of elaboration of a convention, since this promoted greater awareness and understanding of issues, enhanced consultations and provided increased transparency in decisions.

V. OPTIONS FOR PROMOTING ACCESSIBILITY WITH REASONABLE ACCOMMODATION AS INTERNATIONAL POLICY AND STANDARD

Decisions of a number of Governments to adopt policies and legislation on accessibility issues have resulted in a growing number of public, private and non-profit sector initiatives in technical standards and specialized design and development services.⁴⁷ However, at the international level the “Accessibility” Web page on the Internet site of the Division for Social Policy and Development <<http://www.un.org/esa/socdev/enable/disacc.htm>> remains the principal normative and substantive resource.

To understand this situation and better appreciate options for promoting accessibility as both as an international policy objective and technical standard, it is important to recall that the United Nations is an intergovernmental organization, a non-sovereign entity whose functions are performed in pursuit of mandates of the Member States. As discussed above, both the pilot project on Internet accessibility and the recent hosting on the Internet of technical meetings on the new disability convention were undertaken in response to mandates of the United Nations General Assembly. Since the principal source of policy guidance on accessibility is the non-binding Rule 5 – Accessibility - of the United Nations Standard Rules, there is no instrumental basis to oblige bodies and organizations of the United Nations system to design and provide accessible Web sites on the Internet.⁴⁸

International policy instruments are concerned with trans-national conduct. They set forth norms and standards on desired conduct, present priorities for action and describe agreed areas where actions by Governments are to be harmonized, international cooperation pursued and international machinery employed to further objectives. Instruments may be either binding, as a convention among States parties, or a non-binding declaration or action plan. Since the work of international organizations is conducted mainly on the basis of consensus, substantive support to intergovernmental policy processes is a strategic area of concern. There are two principal sets of tasks for substantive secretariats supporting international policy processes: (1) policy formulation and development, and (2) evaluation.⁴⁹ Once an international instrument is adopted, such as the *World Programme of Action concerning Disabled Persons*, substantive secretariats promote public awareness of the instrument and monitor implementation by Governments as well as the involvement of civil society. A related task is maintenance of consistency of obligations identified in the instrument, which involves mobilization and dissemination of information and performance of an institutional memory function in the form of periodic reporting. Substantive secretariats may be requested by Governments to provide technical information and advice, undertake applied research and prepare technical guidelines on application of norms and standards. Secretariats also may provide on request advisory services in the context of technical cooperation activities. Substantive secretariats undertake periodically norm enforcement tasks in the form of periodic reviews of application by Governments of international instruments in terms of progress achieved and obstacles encountered. Norm enforcement functions range from moral suasion in concerned intergovernmental bodies, action by treaty bodies and Charter-based judicial activities of the International Court of Justice.

The decision of the General Assembly to elaborate a new international convention on the rights of persons with disabilities and its recognition, in resolution 57/229, of the role of accessible information to effective functioning and equitable participation in intergovernmental policy processes, provide important impetus to concerted practical efforts to develop international standards on accessibility with reasonable accommodation.

To that end the Government of the Republic of the Philippines hosted from 3 to 7 March 2003 at Manila the "Interregional Seminar and Regional Demonstration Workshop on Accessible Information and Communications Technologies (ICT) and Persons with Disabilities."⁵⁰ The seminar considered policy, institutional and substantive aspects of ICT accessibility in the light of deliberations and decisions of the Ad Hoc Committee established by the General Assembly to consider the elaboration of the convention. On the basis of their deliberations and group work, participants adopted the "Manila Declaration on Accessible Information and Communication Technologies"⁵¹ and "Manila Accessible ICT Design Recommendations,"⁵² both were submitted as technical background documents for the consideration of the second session of the Ad Hoc Committee.⁵³

The "Manila Declaration" summarizes normative considerations in promoting accessibility with reasonable accommodation with special reference to a broad human rights framework; and the "Manila Design Recommendations" provide guidance on first principles and basic considerations to achieve accessibility with reasonable accommodation.

The "Manila Design Recommendations" are based on the premise that Internet accessibility with reasonable accommodation can be achieved with the application of two basic principles:

- (a) Every visual element should be implemented with a textual element that describes it. Alternative text <alt> allows for description of graphical images.
- (b) The structure and layout of the document should be dealt with separately. Structure is defined by HTML (Hypertext Markup Language) elements and attributes; and layout is defined by style sheets. Separation of layout from content aids text browsers to extract easily the logical structure of the document.⁵⁴

The "Manila Design Recommendations" address the issue of barriers in Web-based information goods and services by identifying a select set of "electronic curb cuts"⁵⁵ to provide flexibility to accommodate each user's needs and preferences:

- (a) Provide an Access Instruction page for visitors (explaining the accessibility features of the Web site and providing an e-mail hyperlink for visitors to communicate problems with Web page accessibility);
- (b) Provide support for text browsers and descriptive hyperlinks (links such as "this" and "click here" do not alone convey the nature of the target link);
- (c) Attach ALT<alt> (alternative) text to graphic images so that assistive computer technology such as screen readers can reach the content;
- (d) For each photograph contributing meaningful content to the page, provide a "D" hyperlink to a page providing descriptive text of the image;
- (e) Provide text transcriptions or descriptions for all audio and video clips;

- (f) Provide alternative mechanisms for online forms since forms are not supported by all browsers (such as e-mail or voice/TTY phone numbers);
- (g) Avoid access barriers, such as the posting of documents in Adobe® PDF (Portal Document Format), non-linear format, Frame format or requiring visitors to download software to access the content. If posting in Adobe® PDF, accessible HTML (Hypertext Markup Language) or ASCII text must also be posted by the Web master converting the document.⁵⁶

The "Manila Design Recommendations" represent a specific and practical response to international concern with accessibility in the context promoting and protecting the rights of persons with disabilities. The Recommendations provide guidance on a minimum threshold in accessibility with reasonable accommodation. They are not second-best technical standards but reflect a new management strategy on accessible ICT, which focuses on adaptation rather than remediation. Use of the "Manila Design Recommendations" by governmental organizations and enterprises will allow them to leverage their legacy ICT resources, Internet-based resources in particular, by applying the recommended set of basic considerations in the design and development of accessible Internet content so that it better responds to the needs and preferences of end user communities. The Recommendations are not static, given the rapid pace of change in information and communications technologies, and are always "under construction" to ensure continued improvements in flexibility to accommodate the needs and preferences of all user of electronic and information products and services and communications technologies.

As recommended by the Manila seminar and workshop, promotion and development of the "Manila Design Recommendations" currently involves development and testing of an online accessibility validator by the WorldEnable consortium. The planned release of a pilot validator is fourth quarter 2003 in connection the debate of the General Assembly on progress in the elaboration of a new international convention.⁵⁷

Decisions of the General Assembly on the further elaboration of a new international convention on the rights of persons with disabilities would also affect further development of the "Manila Design Recommendations" in the light of its posited link with international policy frameworks. For instance, the Recommendations could be applied in support of monitoring provisions of the new convention, once that document is adopted by the United Nations General Assembly and States parties ratify, as these pertain to accessibility.

- ¹ *World Programme of Action concerning Disabled Persons*, adopted by the United Nations General Assembly at its 37th regular session on 3 December 1982, by resolution 37/52. "Equalization of opportunities" is the central theme of the *World Programme* and its guiding philosophy for achieving the goals of "full participation" of persons with disabilities in social and economic life and "equality" <<http://www.un.org/esa/socdev/enable/diswpa00.htm>>.
- ² General Assembly resolution 47/88 of 16 December 1992 <<http://www.un.org/documents/ga/res/47/a47r088.htm>>.
- ³ General Assembly resolution 52/82 of 12 December 1997 <<http://www.un.org/esa/socdev/enable/disimpe0.htm>> and subsequent resolutions of the General Assembly on policy and programmes related to advancement of persons with disabilities: resolution 54/121 of 17 December 1999 <<http://www.un.org/esa/socdev/enable/disA54121e1.htm>> and 56/115 of 19 December 2001 <<http://www.un.org/esa/socdev/enable/disA56115e1.htm>>.
- ⁴ <<http://www.un.org/documents/ecosoc/docs/2000/e2000-19.pdf>>.
- ⁵ General Assembly resolution 56/168 of 19 December 2001 <<http://www.un.org/esa/socdev/enable/disA56168e1.htm>>.
- ⁶ <http://www.un.org/esa/socdev/enable/rights/ares57_229e.htm>.
- ⁷ General Assembly resolution 48/96, annex, of 20 December 1993 <<http://www.un.org/esa/socdev/enable/dissre00.htm>>.
- ⁸ <<http://www.w3.org/WAI/Policy/>>.
- ⁹ Leo Valdes, "Accessibility on the Internet" (contributed paper, United Nations 1998 and 2003) <<http://www.un.org/esa/socdev/enable/disacc00.htm>>.
- ¹⁰ Cynthia D. Waddell, J. D., "Applying the ADA (Americans with Disabilities Act) to the Internet: a web accessibility standard", paper presented to the (United States) American Bar Association National Conference "In Pursuit ... A Blueprint for Disability Law and Policy" (Washington, D.C., 17-19 June 1998) <http://www.icdri.org/CynthiaW/applying_the_ada_to_the_internet.htm>.
- ¹¹ Carl Shapiro and Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy* (Cambridge, Massachusetts, Harvard Business School Press, 1998) <<http://www.inforules.com/>>.
- ¹² Nicholas G. Carr, "IT Doesn't Matter," *Harvard Business Review* (May 2003) <<http://www.nicholasgarr.com/articles/matter.html>>.
- ¹³ Accessible information goods and services can serve as (a) the driver for re-engineering by introducing the need to reconsider organizational processes and work flow so that these can make the most effective use of new and emerging information and communications capacities; (b) the enabler of re-engineering by introducing the need to rethink the organizational mission, goals and immediate objectives, the specialized constituencies of the organization and the means by which they can articulate their interests and needs, and the means by which these can be effectively and efficiently addressed; and (c) the contextual basis for re-engineering by introducing the need to review the current social, political and economic setting of the organization and assess the extent to which organizational arrangements, culture and values are appropriate to that setting; they also introduce a need to review and assess organizational resources, both technical and financial, for acquiring, implementing and using effectively newly expanded and improved information and communications capacities. See also John D. Wright, "Is IT a catalyst for re-engineering government?" *Urban and Regional Information Systems Association (URISA) News* (July/August 1995).
- ¹⁴ "Implementation of the World Programme of Action concerning Disabled Persons; report of the Secretary-General" (A/54/388/Add.1), para 20 <<http://www.un.org/esa/socdev/enable/disa54e6.htm>>.
- ¹⁵ Current information is available at the Microsoft "Accessibility" Internet site <<http://www.microsoft.com/enable/>>.
- ¹⁶ <<http://www.opera.com/features/access/index.dml>>.
- ¹⁷ See Leo Valdes, "Accessibility on the Internet" *loc.cit.*
- ¹⁸ Leslie M. Campbell and Cynthia D. Waddell, "Electronic curb cuts: how to build an accessible Web site; paper presented at "Sixth International World Wide Web Conference (Santa Clara CA (USA), 7-11 April 1997) <<http://www.icdri.org/CynthiaW/ecc.htm>>.
- ¹⁹ <<http://www.usability.gov>>.
- ²⁰ <<http://www.w3c.org/WAI/>>.
- ²¹ The "Bobby" online validator has since been acquired and further developed by the Watchfire® Corporation (Kanata ON, Canada); Bobby™ 5.0 is available as a fee-based Web site evaluation service <<http://www.watchfire.com/products/desktop/bobby/default.aspx>>.
- ²² At the time of the pilot project on Internet accessibility, the United Nations home page <<http://www.un.org>> did not meet basic Web accessibility criteria elaborated by the World Wide Web Consortium's Web Accessibility Initiative; this continues to be the case to this day. A "Text-only" option is available at the UN home page, however.
- ²³ The international team was headed by Vision Office Support Services, Ltd. (Canada) in cooperation with Senifor (Spain); the report on the accessible Internet pilot project is available at <<http://www.visionoffice.com/spd>>.
- ²⁴ Critical feedback from beta testers was essential in achieving ease of use and accessibility with reasonable accommodation in the pilot Internet accessibility efforts of the Division. "Treat the beta testers as a key development source", in Eric Raymond, "The Cathedral and the Bazaar" <<http://www.catb.org/~esr/writings/cathedral-bazaar/>>.
- ²⁵ The Web accessibility initiative of the Division for Social Policy and Development of the United Nations Secretariat was recognized for "excellence in Internet accessibility" by non-governmental organizations in the disability field. On 4 December 1998, in a ceremony at the United States State Department in Washington, D.C., the People-to-People Committee on Disability (a non-governmental organisation) presented the "Bernard Posner Award" to the Division.
- ²⁶ "Disability is normal," see Robert L. Metts, Ph.D., "Planning for disability", paper presented at Panel Discussion on Independent Living and Persons with Disabilities, United Nations, 3 December 1998 <<http://www.un.org/esa/socdev/enable/disid98f.htm>>.
- ²⁷ "Implementation of the World Programme of Action concerning Disabled Persons; report of the Secretary-General". A/54/388 and Add.1 <<http://www.un.org/millenniumgoals/index.shtml>>; A/56/169 <<http://www.un.org/esa/socdev/enable/disA56169e1.htm>>; and A/58/61 – E/2003/5 <<http://www.un.org/esa/socdev/enable/disa5881e.htm>>.
- ²⁸ "Implementation of the World Programme of Action concerning Disabled Persons; report of the Secretary-General" (Interim report). E/CN.5/1999/5 <<http://www.un.org/esa/socdev/enable/disece0.htm>>; E/CN.5/2001/7 <<http://www.un.org/esa/socdev/enable/disece017e0.htm>>.
- ²⁹ Leo Valdes, "Accessibility on the Internet" (contributed paper, New York 1998 and 2003) <<http://www.un.org/esa/socdev/enable/disacc00.htm>>.

- ³⁰ Seminar on Internet information policies, structures and technologies (United Nations, 16 December 1998 and 6 May 1999) < <http://www.un.org/esa/socdev/enable/access2000/>>.
- ³¹ < <http://www.worldenable.net/seminars.htm>>.
- ³² "About WorldEnable" < <http://www.worldenable.net/about.htm>>.
- ³³ Internet Accessibility; an ASEAN perspective (Bangkok, 12-16 July 1999) < <http://www.worldenable.net/iaasean/>>.
- ³⁴ Seminar on Internet Accessibility for All in Central and Eastern Europe (Ljubljana, 3-6 September 2001) < <http://www.worldenable.net/cee2001/default.htm>>.
- ³⁵ Seminario sobre Accesibilidad en Internet para todos (México DF, 4-7 de Junio 2001) < <http://www.worldenable.net/mexico2001/default.htm>>.
- ³⁶ General Assembly resolution 52/82 of 12 December 1997; General Assembly resolution 54/121 of 17 December 1999; and General Assembly resolution 56/115 of 19 December 2001; see "Parliamentary Documents" page < <http://www.un.org/esa/socdev/enable/disparl.htm>>.
- ³⁷ General Assembly resolution 55/2 of 8 September 2000 < <http://www.un.org/millennium/declaration/ares552e.htm>>.
- ³⁸ General Assembly resolution 56/168 of 19 December 2001, "Comprehensive and integral international convention to promote and protect the rights and dignity of persons with disabilities" < <http://www.un.org/esa/socdev/enable/disA56168e1.htm>>.
- ³⁹ The first session met from 29 July to 9 August 2002 at the United Nations; see "Report" (A/57/357) < <http://www.un.org/esa/socdev/enable/rights/adhoca57357e.htm>>.
- ⁴⁰ Adopted as General Assembly 57/229 of 20 December 2002 < http://www.un.org/esa/socdev/enable/rights/ares57_229e.htm>.
- ⁴¹ < <http://www.worldenable.net/about.htm>>.
- ⁴² Inter-regional Expert Group Meeting on the Comprehensive and Integral International Convention to Promote and Protect the Rights and Dignity of Persons with Disabilities (Mexico City, 11-14 June 2002) < <http://www.sre.gob.mx/discapacidad/home.htm>>.
- ⁴³ Online activities page < <http://www.sre.gob.mx/discapacidad/online.htm>>.
- ⁴⁴ < <http://www.worldenable.net/quito2003/>>.
- ⁴⁵ < <http://www.worldenable.net/beirut2003/>>.
- ⁴⁶ < <http://www.worldenable.net/bangkok2003/Default.htm>>.
- ⁴⁷ Debra Donston, "Web access for all; tech analysis: accessibility issues too important to ignore," *eWeek* (May 19, 2003) pp 54-57 < <http://www.eweek.com/article2/0,3959,1090387,00.asp>>. Ms. Donston cites research by the Meta Group Inc. that identified business drivers for accessibility: regulatory (high priority); improved relationships (medium priority); increased transactional commerce (medium to low priority); "feel good" marketing (low priority), *Ibid.* p 57.
- ⁴⁸ Only a minority of the UN system sites were found to provide accessibility with reasonable accommodation on the basis of the "Cynthia says" online validator, which checks for compliance with accessibility standards of section 508 of the Rehabilitation Act of the United States < http://www.icdri.org/test_your_site_now.htm>. Common errors noted were the need for text equivalents for graphical content, use of frames and proprietary formats to publish Web content.
- ⁴⁹ John R. Mathiason, "Managing global governance" (Paper contributed to Robert F. Wagner Graduate School of Public Service, New York University (USA)) ©1997 < <http://www.intlmgmt.com/portfolio/Mangov.html>>.
- ⁵⁰ < <http://www.worldenable.net/manila2003/>>.
- ⁵¹ < <http://www.worldenable.net/manila2003/declaration.htm>>.
- ⁵² < <http://www.worldenable.net/manila2003/DesignRecommendations.htm>>.
- ⁵³ The second session met from 16 to 27 June 2003 at the United Nations; see "Report" (A/58/118 and Corr. 1) < http://www.un.org/esa/socdev/enable/rights/a_58_118_e.htm>.
- ⁵⁴ See also the discussion by Association Braille Net, "To make a site more accessible" < <http://www.brailenet.org/accessiblite/liuveblanc/english/accessibilite.html>>.
- ⁵⁵ Cynthia D. Waddell, JD. "The Growing Digital Divide in Access for People with Disabilities: overcoming barriers to participation" (1999), pp 10-11 < http://www.icdri.org/CynthiaW/the_digital-divide.htm>.
- ⁵⁶ See Cynthia D. Waddell, "Overview of Law and Guidelines," Chap. 2 in Jim Thatcher et al., *Constructing Accessible Web Sites*, (Birmingham (UK) Glasshaus, 2002), republished July 2003 (San Francisco, CA (USA) Apress). < <http://www.apress.com/book/bookDisplay.html?bID=342>>.
- ⁵⁷ A beta version of the "WorldEnable Validator" is available at < <http://www.worldenable.net/wevalidator.htm>>.