



Report from the
CONCERTATION MEETING ON FUTURE RESEARCH AGENDAS
FOR E-ACCESSIBILITY

7 JUNE 2012 – BRUSSELS

This concertation meeting was organized by the Commission services (Unit "ICT for Inclusion" - DG Information Society) with representatives of the main research or innovation projects or networks/studies currently or recently funded which have a significant relevance for discussing needs and road-mapping future research in that area of e-accessibility.

The following minutes cover the keys issues form the presentations given and the subsequent discussions. Copies of the supporting slides are attached in appendices, as is the agenda with the projects list. The meeting was chaired by François Junique [FJ], project and policy officer in that EC unit. Unfortunately no representative from the new unit "Inclusion, Skills & Youth" was able to be present. The meeting was assisted by four rapporteurs:

- Ms. Gaelle Calvary – Grenoble INP - France
- Mr. Giancarlo Iannizzotto – University of Messina - Italy
- Mr. Oivind Lorentsen – Rehab-Nor AS - Norway
- Ms. Moira Owens – University of Wolverhampton - UK

1. INSTRUMENTS FOR DRAWING RESEARCH AGENDAS

1.1. Ageing well / ICT research agendas (BRAID)

Filippo Cavallo

AALIANCE (The European Ambient Assisted Living Innovation Alliance) project is about Ambient Assisted Living (AAL) solutions and advanced ICT technologies for ageing and wellbeing of older persons in Europe, and the aims are to provide roadmaps and strategic research agendas, market and business models, standards and certifications, and establishment of AALIANCE network.

AAL can have different levels of interventions, such as in prevention, support and compensation, and independent and active ageing, resulting in higher quality of life for the target group. The approach takes interconnections across different stakeholders, and requires strong innovations at the level of the service organisations. He stressed the importance of customizations and adaptability, flexibility, reliability, security and acceptability and usability.

There are challenges such as, ambient intelligence, interacting interfaces, service robots, standardisation and interoperability, technologies for formal and informal caregivers. The importance of including the “voice-makers” was highlighted. Design for acceptance on the individual levels as well as on the society level is important. As to a question about where to put the money, there is no quick answer.

1.2. SDDP methodology (CARDIAC)

Patrick Roe and Yiannis Laouris

Introductory: Yiannis presented Structured Dialogic Design Process (SDDP) as a tool, in this context, to produce research roadmaps. He described the instruments and the rules, as well as the process itself. Experts are invited to express their ideas and proposals in response to a triggering question. The process is democratic. All participants are heard and respected. As part of the process, the method allows for deeper clarifications and detailing about the proposals and the meaning behind. After clustering into groups, a discussion and voting procedure is carried out, allowing the experts to vote for the most important ideas, followed by influence voting. Thus, interrelations are explored as a basis for production of roadmaps.

The objective of the CARDIAC project is to advise the European Commission as to where to direct research funding in the fields of accessible and assistive ICT, and Patrick showed and explained some examples of influence trees and sub-influence trees, based upon proposed ideas from one of their SDDP-meetings. The triggering question was: “What type of research is missing that could facilitate development of inclusive HCI”. The influence trees are being used as background material for developing roadmaps. Summing up, Patrick presented the main features of the SDDP process:

- Identify main influences between the ideas
- Give a first prioritisation and clustering of ideas
- Democratic way of gathering the collective wisdom from a wide range of stakeholders
- Collective learning during the process
- Sense of ownership of influencing tree generated by the participants

In response to a question on weaknesses, the importance of inviting the right stakeholders was stressed, as well as the necessity for the participants to commit time.

Answering a question regarding funding, Patrick Roe said that it does not make sense to discuss size of funding or size of research. It is necessary to complement the work by other methodologies.

As to timing of research activities proposed, the experts participating are asked to indicate short, medium and long terms. Patrick Roe is expecting three separate roadmaps from the CARDIAC project - technology transfer issues to be included.

1.3. W3C/WAI research forum (WAI- ACT)

Shadi Abou-Zahra

Part of the WAI-ACT project is to support the development of research roadmaps. WAI-ACT stands for Web Accessibility Initiative (WAI) - a cooperation framework for guidance on advanced e-Accessibility. The project is lead and builds upon the strengths of the existing World Wide Web Consortium (W3C) WAI cooperation mechanisms, to facilitate strategic European and International participation throughout the project. The project invites participation and involvement of all relevant stakeholders. Anyone can help develop resources such as the working group notes, review these drafts, and provide input.

The project work is carried out through W3C/WAI working groups and includes: Guidance on uptake, implementation, and evaluation of WCAG 2.0; Contributing to international harmonization; and providing input to e-Accessibility research agendas. The project is addressing the following needs: expanding cooperation on accessibility; authoritative implementation guidance; harmonizing evaluation initiatives; e-Accessibility research coordination.

The project is setting up a research catalogue on research topics on web accessibility, also indicating references to resources. Some current issues are: people with cognitive disabilities, virtual and augmented reality, mobile accessibility, gestures and events, social networking, digital broadcasting, online education, cloud computing, e-Health, and aging. Shadi urged experts and projects to send further topics and suggestions.

Some of the discussion was about the challenges of engaging experts/participants from outside the field of e-Accessibility. There was no clear answer to this question, other than the gain by the growth of the mutual knowledge platform.

As response to a question on how to structure and select the most important topics, Shadi explained that they had a set of different criteria for this purpose including the currency and anticipated impact for a topic on accessibility. The decisions are always based upon consensus in the group.

1.4. AT research forum (ATIS4all)

José-Angel Martínez Usero

The aim of the project is to facilitate access to information about best solutions according to users' needs and preferences, as well as contextual characteristics. Also, the aim is to support the development of open source assistive technology software and other cutting-edge technological solutions. ATIS4all is setting up a more global portal of European ICT AT, and serves as a repository of different databases. The EASTIN 2.0 Portal includes: AT products, including solutions and components; Market place, including a user experience forum, and also, facilitating input from the community in identifying new ideas; Research and Development community, including a place for discussions on research agendas addressing AT and a project ideas forum; Websites for ATIS4all and ETNA sister project.

The project ideas forum is addressing topics such as: Projects (outcomes, opportunities for collaboration, events), funding opportunities, best practices (including user involvement), publications, training material, standardisation processes related to AT, tools for ICT AT developments, among others.

José-Angel underlined that ATIS4all facilitates a portal for researchers, as well as all other stakeholders along the value chain, including end-users. - Also targeting financing agencies. Twitter and blogs will be used for encouraging the sharing of ideas.

After listening to the speakers, Gregg Vanderheiden expressed a feeling that the European approach in road-mapping and developing research agendas had a more integrated approach than in USA. A fruitful way forward would be to facilitate more bridging across the sea, and to find mechanisms for collaborative proposals between USA and Europe. Peter Korn agreed and pointed out the value of such collaboration between EU, USA and Canada as demonstrated in AEGIS.

A suggestion was made that perhaps the boxes that inform the influence maps as shown by the CARDIAC project could be used as elements that should be included as part of a project proposal.

Much of the discussion was on how to engage people in networking activities, and in activities like road-mapping. People are overloaded by work, and have problems in allocating time for such participation. Also, often such work is not being paid for.

Involving end-users are important. Some participants felt training of end-users to support their participation in R&D projects should be encouraged. One participant indicated that more disabled persons should be encouraged to enter engineering studies, while others more valued the experience and knowledge base as a user.

Financing user participation is important, but is not always an easy issue. Such financing also has to include financing of user assistants if that is relevant for the individual user. In general, when budgeting projects, financing of user participation ought to be on equal basis as other participants.

User organisations ought to develop strategies for user participation in projects.

An opinion was expressed that in addition to end-user involvement, it is also important to include professionals on user research (also clinical medical experience when needed), as well as AT provision specialists having a broad experience and knowledge base on disabilities, AT service delivery methods and processes. This also includes service providers when ICT are to be integrated in service infrastructures. These professionals represent a valuable knowledge platform. The field takes an interactive interdisciplinary approach.

2. POTENTIALS & CHALLENGES REGARDING ICT FOR ACCESSIBILITY AND ACCESSIBLE ICT

All the presentations together stress the vision of a plastic symbiotic ecosystem in which the convergence of the digital and the physical worlds might empower people whatever their disabilities are. The challenge is to progress in maturity, to go beyond technical partial proofs of concepts and to elaborate theories that in turn help in structuring research and development, and thus in producing “low cost” well fashioned and well assessed assistive technologies. The talks highlight the intrinsic complexity of this multi-facetted challenge.

2.1. Framework for e-Accessibility (AEGIS OAF)

Peter Korn and Maria Fernanda Cabrera

AEGIS claims for open accessibility everywhere. It aims at investigating if and to what extend 3rd generation accessibility techniques will provide a more accessible, more exploitable and deeply embeddable approach in mainstream ICT (desktop, rich Internet and mobile applications). AEGIS explores this approach through the Open Accessibility Framework (OAF), addressing aspects of design, development and deployment of accessible mainstream ICT.

OAF is a first attempt to generalize and formalize the accessibility process. OAF is structured along six steps, three of them being about Creation (Step1: define accessible; Step2: stock elements; Step3: development/authoring tools) and three others about Use (Step4: platform support; Step5: the application itself; Step6: assistive technology). OAF is said to be useful for analyzing projects (which steps do they cover and how), for building accessibility as well as for reasoning on the future (e.g., encouraging the development of open source building blocks).

Outcomes from users are that the price of solutions is critical; European speak many languages that need to be supported; Accessible Rich Internet Applications (ARIA) is not ready to be deployed; different interaction models mean that end-user training is critical for the new “web-application” interaction model; and browsers and AT are not mature enough.

Additional lessons are that more work is needed in cognitive area and platform wide cognitive AT – huge potential for significant advances; also lots of potential for AT for physical impairments (e.g. ratio of people employed with CP/MS lower than portion of blind who employed [which is also too low a number]); involving users is very hard but highly valuable; leveraging open source community projects is also hard but valuable; standards play a critical role.

AEGIS is not about developing AT, but it’s appropriate to now develop AT – the 3rd generation accessibility approaches from AEGIS should enable significant advances in AT.

2.2. Virtual User Modeling and Simulation (VERITAS/VUMS)

Margherita Antona

VERITAS aims to develop methodologies and tools to support the whole development process of accessible products and services. Virtual Reality (VR) technologies and simulation shall allow product designers to experience and verify the accessibility of the developed product without involvement of the actual end users with impairments and disabilities. The underlying user model is supposed to simulate elderly people and individuals with mild to severe visual, cognitive, motor, hearing and speech impairments. Simulation is intended to support a realistic user testing at all development stages, which is expected to increase the productivity of designers and the accessibility of the resulting products. VERITAS aims to verify this new methodology in five selected application scenarios: automotive, smart living spaces, workplace, games, and health care.

Regarding the VERITAS methodology and architecture, the point is to combine a user model and a task model to simulate the user while performing the task. The user model covers the physical, cognitive and psychological features of the user as well as his/her behavior. It is based on the knowledge available in the literature, enriched with real data gathered from a multi-sensorial platform. Scenarios are given in input. The platform performs the task automatically so that to discover accessibility problems through motor, visual, and cognitive simulation (3D for non ICT products, 2D for ICT). The use of the platform in concrete pilots intends to validate the models and the approach, as well as to consolidate knowledge about the platform and its benefits.

VUMS is a cluster of running projects: VERITAS, GUIDE, MyUI, VICON, and VAALID. The intention is to reach a sufficient critical mass for meaningful progress and impact in the field, first by generating synergies due to the related objectives of the associated projects. Outputs are a common glossary, a white paper on standardisation, a common ethical framework, as well as a common format to exchange user profiles.

There are challenges in accessibility in AMbient Intelligence (AMI) environments. AMI raises new problems, as it introduces not only one new technology but a set of new technologies. Communication with users about the emergence of new technologies is difficult. As a result, there is a need of appropriate development and evaluation frameworks (including the large set of existing models, tools and interaction technologies from research and available on the market) as well as of large scale pilots to see how to exploit the richness of the environment to offer better accessibility to users, and to see how people behave within the environment. The open issues are methods for collecting requirements, methods for understanding the context of use, design guidelines, user interaction models, design methods, UI adaptation and personalization, evaluation instruments and methods, computer aided design tools, pilot applications, and simulation tools.

2.3. Cloud based accessibility (CLOUD4all)

Gregg Vanderheiden and José-Angel Martínez Usero

Cloud4All envisions a new generation of accessibility support through cloud computing. The corner stone is the concept of user needs and preferences that are stored in the cloud

or, optionally in a personal device like a ring, or phone, or key-fob, and that are used to instantly make any product or service that a person encounters usable and understandable to the individual. It does this by launching and configuring any relevant built-in accessibility/usability features of a product or service and/or by invoking and configuring cloud based features or services.

This is a radical new paradigm for addressing accessibility: it is a switch from ad-hoc adaptation of individual products and services for a person (2nd generation) to automatic personalization taking benefit from built-in accessibility features and cloud computing technologies. The main project innovation will be in building and testing core components of the proposed Global Public Inclusive Infrastructure (GPII). The largest of these will be an intelligent yet intermediate self-adaptive layer able to match, in real time, the user profile (which includes the context-base needs and preferences) with the access features of application/device that the user intends to use, the assistive technologies that are installed on it or that are available from the cloud.

Main expected outcome is to provide an infrastructure capable of auto- personalizing a large range of OS, web browsers, applications, platforms and devices based on a user's needs and preferences profile. It will also include work on capturing and federating information on the range of solutions available and on describing both the solutions and user-needs and preferences in standard ways.

The talk highlighted three core functions of the GPII:

- will something help me and, if yes, what?
- providing auto-personalization of on any device, anywhere, any time;
- tools to make it easier, and lower cost, to create, market, and support new solutions.

The expected results would simplify accessibility; increase built-in accessibility; grow the market for assistive technologies and services; facilitate international collaboration and increase the number of ideas that make it to market. A demonstration was given using NFC rings to auto-personalize computers and cell phones to meet the needs different users.

Cloud4All/GPII will both cause some disruption but it also is a way for vendors and consumers to better deal with the ongoing disruption that modern low cost technologies (particularly the iOS and Android platforms) are creating. Cloud4all/GPII will also introduce a potential to move from purchase to lease or renting accessibility and ATs.

These developments also point out a need to go beyond technology and study the social implications in large scale, real environments. The work also points out **a need funding BIG SOCIAL infrastructure in a manner similar to BIG SCIENCE infrastructure.**

2.4. Ambient Intelligence (UniversAAL)

Juan Carlos Naranjo Martinez

UniversAAL aims to produce an open platform that provides a standardized approach making it technically feasible and economically viable to develop AAL solutions. The platform will be produced by a mixture of new development and consolidation of state of the art results from existing initiatives.

The vision of UniversAAL is supported by three pillars: a runtime support (a platform) that provides a execution environment for AAL services, tools for developers (depot, reference architecture and guidelines) and the community support (Ustore, AAL sample services, training and roadmap). The rationale behind universAAL is that it should be as simple for users to download and setup AAL services as it is to download and install software applications on a modern operating system. UniversAAL will establish a store providing plug-and-play Ambient Assisted Living (AAL) applications and services that support multiple execution platforms and can be deployed to various devices and users. Finally the allocation of local human resources is also supported in the store.

Further research in e-accessibility for Ami systems is based in two main areas: the User Interaction components and the Context management.

The research related to the user interaction should be focused in the creation of meta-models for interaction; e-accessibility for cognitive impairments (avatar, tools/models); motivation techniques in AAL environments; serious games and viral learning; quality models for evaluation frameworks addressing e-accessibility; goodies/tapas as solution for cost/low quality/time to market (reusable artefacts); multimodality; personalization; guidelines.

Context awareness research related to e-accessibility should be focused in improving the extraction of information of the environment and providing information about the status of the user. The information collected can be used in the adaptation of the interface to the actual need of use.

2.5. BNCI (TOBI)

José del R. Millán

TOBI (Tools for Brain-Computer Interaction) aims at developing practical technology for brain-computer interaction (BCI) that will improve the quality of life of disabled people and the effectiveness of rehabilitation. TOBI will design non-invasive BCI prototypes that will be combined with existing assistive technologies and rehabilitation protocols. In such a hybrid approach users can couple brain interaction with muscle-based interaction or can naturally switch between the different ways of interacting.

Non-invasive BCI are based on electroencephalogram (EEG) signals. The EEG is recorded through electrodes placed on the user's head. This technology is not invasive and only records the electrical activity of the brain without interfering with it.

TOBI is expected to have an impact by broadening the appropriate use of BCI assistive technology, by incorporating adaptive capabilities that augment those other assistive technologies they are combined with.

The focus is set on people with motor disabilities. Four application areas are considered: Communication & Control, Motor Substitution, Entertainment, and Motor Recovery. After a pre-clinical validation the BCI assistive solutions will be tested and evaluated in real life situations by different populations of end-users. TOBI will also carry out research on the philosophical and ethical aspects of brain-computer interaction.

2.6. Assistive and Companion Robotics (Robot-Era)

Filippo Cavallo

The objective of the Robot-Era project is to develop, implement and demonstrate the general feasibility, scientific/technical effectiveness and social/legal plausibility and acceptability by end-users of a plurality of complete advanced robotic services, integrated in intelligent environments, which will actively work in real conditions and cooperate with real people and between them to favour independent living, improve the quality of life and the efficiency of care for elderly people. Different already available and commercial robotic systems will be adapted and integrated to cooperate and operate in domestic, condominium and outdoor environments. The Robot-Era project aims to implement a fully realistic and real experimental setup in urban and domestic environments and with different kinds of citizens: the elderly users, the service providers, the municipalities, and the caregivers.

The key points are personal companion for users at home; shared companion robot for users in the community; interconnected and interoperable systems; service robotics for social innovation (sustainable welfare, co-workers); robotic systems as fundamental agents in the smart cities; legal and insurance policies for managing the presence of robots inside the urban and private context; and design for usability and acceptability (also ethical point of view).

Regarding a question about open source, the answer claimed for a mix of open source and commercial components, as exemplified by the Kinect.

2.7. Conclusion: Elicitation of principles and challenges

The following meta-lessons can be drawn from the presentations:

- (1) **Open the door:** ...and discuss with other projects. The VUMS cluster and this concertation meeting are excellent examples to prevent everybody, including the Commission, from diluting effort.
- (2) **Open the box:** ...and think people in action in a dynamic, heterogeneous, and open world. Cloud4All is a good example for that.

In addition to these meta-lessons, key challenges can be elicited:

- (3) **From micro to macro - towards generalization:** There is a need to be holistic, systemic, and address accessibility in its whole while considering the human as an entity with several disabilities (see the VERITAS tower of accessibility as well as the AEGIS OAF framework).
- (4) **From static to dynamic - towards plasticity:** There is a need to consider the user while achieving his/her task in a changing environment (see indoor/outdoor in Robot-Era).
- (5) **From mono to multi - towards composition:** There is a need to combine methods, models and tools so that to cope with multi-diseases (see TOBI and

Robot-Era for instance). In several communities, theory of composition is said to be one of the grand challenges for the coming years.

- (6) **From exploratory to mature - towards reusability and standardization:** There is a need to deliver mature, plug&play products at low cost (in particular ATs) and environments (e.g., browsers) so that to trigger a large adoption and reuse (see AEGIS, Cloud4All and UniversAAL for instance). Open source is a means for that (see AEGIS).
- (7) **From realistic to real - towards in the wild experimentation:** There is a need to involve users (see AEGIS) so that to go beyond technical evaluations and reach social findings.

3. OTHER NEEDS AND VIEWS – WIDER PERSPECTIVES

3.1. Needs from deployment (e-Access+)

Carlos Velasco

The thematic network builds the cooperative platform for: coordinating, supporting and improving the implementation of e-Accessibility throughout Europe Community of Researchers.

- Areas of Activity: Web accessibility, Accessible communication, Self-service terminals.
- The growing divide and the overlap between industries.
- Why e-Accessibility: ethical, policy, stats, legal, technical, social, business reasons.
- The network eAccess+ is filling the following gaps: Awareness, Legislation, Tech solutions, Standards, Know-how/education, Take up.
- Rationale: better and guided access to existing resources (guidelines, tools, success stories)
- Approach: Contact stakeholder, Consult and guide towards implementation, Disseminate and involve towards implementation, Provide analysis and roadmap where needed.
- Information HUB – a semantically enriched guide to e-Accessibility resources: targeting user groups, guidelines on best practices, lack of tools for website, new countries.

Series of roadmaps on e-Accessibility: Collection; Relevance check; Aggregation and allocation; Identification of tools and measures; Identification of sub-tasks and prerequisites, key players and Consolidation of milestones and success criteria.

Road-mapping:

- Intended audience and dominant perspective of roadmap; Present status of the space using social, political, economic, sustainability and other indicators; State of the art (description of technology/innovation platform(s) and (tech customer) metrics that define their performance).
- Description of major drivers, trends and shifts impacting or could impact the space; Characterization of how such changes are likely to manifest – anticipated scenarios.
- Limitations, problems, capability gaps; Definition of major innovative themes
- For each theme develop a statement of innovation progression; Unpack the projects and sub-projects to bring each theme into reality; Summary of major themes and decision points

Q - FJ – when interacting with people in the field, are all the necessary resources ready?

A – too early at the moment

Gregg Vanderheiden – there is material already in a common location – NARIC¹

¹ <http://www.naric.com/> - National Rehabilitation Information Center's online gateway to an abundance of disability- and rehabilitation-oriented information organized in a variety of formats designed to make it easy for users to find and use.

3.2. Needs from standardisation (M376)

José-Angel Martinez Usero

Main outputs or deliverables prepared by M376: a Standard "EN301-549" on European accessibility requirements for public procurement of ICT products and services", specifying the functional accessibility requirements applicable to ICT products and services; and an On-line Toolkit for public procurers. The Standard will contain: Specs of functional accessibility requirements, Full description of test procedures, and Evaluation methods for each requirement.

Significant Issues: Testable requirements, Web evaluation methodology, Interoperability aspects, timescales.

Examples of standardisation needs in R&D projects – and involvement of M376: APSIS4ALL, CLOUD4ALL. When you research you realise you need to do something about adapting and refining existing standards.

Q/FJ – M376 had 2 phases – phase 2 is about selecting or complementing standards we want to use in Europe. But during phase 1 you have identified gaps that might not be immediately filled. Which further research would be needed for those?

A – It's a bit vague at the moment but we can get a list and identify specific items such as emergency services. M376 and others have been pushing for coverage of cognitive aspects and ICT. More research is needed – before we can have regulations we need to understand more and there are other disabilities to consider too. Different levels of cognitive ability have to be considered. ICT was not powerful enough for cognitive support until last decade. Even now before we can make rules we need to figure out what's feasible/acceptable in particular regarding ethics. In this respect José-Angel suggested to ask ETSI STF416 about the research gaps identified in order to develop adequate functional requirements or to test them against certain technologies.

A/FJ – regarding ethics for cognitive support, some work is available from the military domain where they are already confronted by ICT and chemistry enhanced cognition, and issues like the "extended-self".

3.3. Disability Communities View – European Disability Forum

Nadège Riche

About EDF:

- EDF – unique and leading European organisation representing all persons with disabilities.
- EDF Mission, Values and Vision - *Nothing About Us Without Us*
- European Research Agendas for Disability Equality (EuRADE) – objective – to increase and enhance full participation of Disabled People's Organisations as equal and active partners in future research initiatives.

Results from reviews undertaken:

1. Need for EU research to switch to the social model of disability, as still oriented towards medical model
2. Mainstream the UNCRPD
3. Adapt EU funding schemes enabling participation of persons with disabilities

4. Tools used at present are not inclusive. Need to develop new structurally inclusive tools taking into account the specificities of Disabled People Organisation

Requirements for Horizon 2020:

- Social versus medical model of disability
- Allow for 100% funding for Disabled People Organisations
- Cover costs related to accessibility for participation of persons with disabilities
- Accessibility of documents and research materials

3.4. Industry View

Peter Korn

Shared goal: realizing ongoing improvements in e-Accessibility.

Context of accessible ICT: it occurs within an e-Accessibility ecosystem including not just the ICT application but also: the operating system, the hardware, the AT, the browser, the employer, the employee/user, training given to the employee/user, ICT consultants/implementers, support systems, helpdesk, and ICT standards.

Issues:

- Standards aren't uniform across worldwide markets (not just US/EU, but EU Member States differ from each other); Training not keeping up with web applications – ongoing training for users in AT & technology is critical; Enterprise support unfamiliar with AT; Web delivery chain not kept in sync/up-to-date

Addressing these issues:

- Globally harmonized accessibility standards critical, and should be voluntary, globally harmonized, industry-led, open, transparent, specifying functional requirements, be cross-platform and technology neutral; Design standards also critical; Must be able to move technologies (e-Inclusion shouldn't hold back progress); Procurement key step but not last step; 3rd party certification not the solution; Self-declaration should remain preferred.

Research:

- AT for disabilities not yet served or served well; A focus on delivery chain solutions; Need research and solutions ahead of regulations (e.g. research on accessibility solutions for people with cognitive disabilities ahead of requiring ICT meet their needs); Research on best practices; Further research into why web sites aren't accessible where and why (cf. ANEC/Middlesex University study).

Q – Small companies say self-certification is hard to do in terms of capability.

A – Clarity of accessibility standards is needed. Requirements should be on outcomes not who does the work or assessment: companies are free to engage a 3rd party if they want.

Gregg - If I need to certify then I need to have concrete criteria. Further research is needed on how we go about this and how we do testing on complex systems. More information is needed on development techniques – to guide the developers.

Q – How do you test that certain technical requirements are passed or not? From requirements to a solution – how do you make industry do it? Solutions that enable these voluntary standards to be implemented – how to ensure a framework on e-Accessibility?

A – That is the big struggle we all have and often because there are so many layers. Network technology is a good example: they are similarly heterogeneous with many layers and it all works with voluntary, industry-led standards. Because disability is related to such a small percentage of the population, there may not be enough awareness of about e-Accessibility techniques and operational issues until ICT has moved on. Again greater clarity around these techniques & standards will help here.

3.5. A Vision of HCI

Gaëlle Calvary

Mainstream HCI is increasing in complexity: **Heterogeneity, Dynamicity, Emergence, Scalability, Uncertainty, Incompleteness**. Ambient intelligence is an example of research area that combines these challenges all together as depicted in the 6th sense from Pattie Maes.

This evolution of HCI can be structured along four new dimensions which all together make demonstrators switch from traditional applications to blue sky proofs of concepts:

- the **Intention** of the end-user is no more predefined at design time but may emerge dynamically, taking benefit from the arrival of services in the cloud typically,
- **Information** manipulated in the user tasks may be extended to big data, covering crowd sourcing,
- **Interaction** is no more limited to traditional input and output devices but may take benefit from advances in mixed interactive systems, interaction techniques, interactive visualization, as well as in recommender systems for mastering the mass of data,
- The **Involvement** of the end-user is also changing, being no more limited to the use of an interactive system created by someone else, instead becoming the programmer of his own interactive space. This is what is called end-user programming.

Considering the variability of these dimensions at runtime, there is a need of a dynamic adaptation to cope with variations of the context of use. The right info has to be pushed dynamically at the right place in the right format. Plasticity becomes an important quality. Some outcomes in accessibility could be disseminated under this umbrella.

Two classes of challenges can be distinguished:

- “Thin tip” challenges for the invention of systems;
- “Large tip” challenges for the invention of methods, models and tools.

More and more, dissemination has to focus on key conferences and journals. Main conferences in HCI are for instance: CHI, Interact, BCS HCI, NordiCHI, OzCHI, UbiComp, Pervasive, MobileHCI, AMI , etc. (very broad scope of conferences)

There are also useful instruments for networking such as SIGCHI, IFIP, ERCIM.

4. NEEDS FOR EU TO SUPPORT E-ACCESSIBILITY RESEARCH & INNOVATION.

4.1. Draft results from the study “Implication of Future ICT on e-Accessibility”

Patrick Crehan – CEO, CKA

The study e-Accessibility 2020 does not focus only on e-Accessibility but has broader scope, including assistive technologies. The main concept which has been emphasized during this presentation is that in Europe the level of awareness about the importance of e-Accessibility is in general very low among small companies. There is a widespread misconception that the market for accessibility and assistive technologies in ICT is only bound to the disabilities area and therefore interesting only to a small minority group of people. Such idea should be left behind: in principle the market is much larger, as the potential applications invest a large number of users, technologies and products.

Five major topics should be investigated, with “Design” as the central issue. There are several kinds of user-centered design methodologies but the most interesting is perhaps Universal Design (UD). Those methodologies should be considered of interest not only by engineering schools but also marketing schools and traditional design schools.

A central topic is Human modeling: human capability models are needed, as the user himself is not always able to provide sufficient information about his needs. For example, users often realize that they need glasses much later than they actually need them.

Putting the user at the center of the design process is crucial for achieving a higher degree of inclusion. In several cases the word “digital divide” should be read “poor design”.

4.2. Discussions and conclusions

Several interesting and significant suggestions and issues were pointed out during the final discussion. Two clusters of statements can be delineated: **technologies** and **issues**.

Among technologies to be further investigated were reported: brain-computer interaction, user modeling including the whole interaction process, robotic interfaces, adaptation and personalization, environments for simulating the users interaction at design time, focus on design (UD or D4All) to consider disability in advance.

Among the most significant issues which were pointed out: ways to gather information from the other EC Projects in the same or related areas, keeping people with disabilities in the design (chain) process, promoting a holistic approach to design for all, keeping in mind psychosocial aspects and enforcing interdisciplinary discussion at all levels of design and research, incorporating accessibility into large scale agendas, better policies for capitalizing the knowledge produced by EC-funded projects and the realization of big, social, research infrastructures to enforce the research in this area, as relying just on the interest of commercial and private financial stakeholders is probably not sufficient.

Concerning Horizon 2020 - key items for taking forward are:

- The inclusion of disabled people and their representative organisations in a timely manner
- Funding arrangements to facilitate the inclusion of persons with disabilities and related organisations
- Consider having people from the business world identifying the research agenda?
- More emphasis on how projects can enhance the daily living experiences of people with specific disabilities.
- To consider an extra layer in the proposal evaluation phase – particularly in relation to service user/stakeholder engagement – where methodological designs are scrutinized by a small panel, on behalf of the Project Officers, before negotiations begin.
- To encourage pockets of strong and provocative proposals - consider including one or two opportunities for proposals that are required to have less boundaries?

As general remarks, the content of these concertation-meeting sessions was rather heavy on recognising what is needed but lighter on how to address the issues. The outcome(s) of projects might need further transparency to ease take-up. Also there are similarities between projects, and to avoid duplication of some intersecting work, projects should make a bigger effort regarding awareness of each other's work. They would also benefit from more awareness-raising on the coordinating aspect of their work.

4.3. Before Closing

The current ideas for the 2013 work-programmes of FP7 and FP8, as well as the current thought on the structure of the replacing Horizon2020 framework-programme were very briefly presented by the project officer.

Finally the project officer briefly explained the new structure of EC DG-CONNECT (as DG INFSO is renamed) and where the current Research & Innovation activities will be going: under new Directorates “Media & Data” and “Sustainable & Secure Society”.

Himself, he is moving to the new Future and Emerging Technologies (FET) Flagship unit, after more than 11 years spent on the topic of e-inclusion/e-accessibility and ageing well. Although it is too early to know which two topics will be funded among the current six FET flagship pilots², some of them – e.g. Guardian-Angels, Robot-Companions or Human-Brain - could have an impact on e-Accessibility.

² http://cordis.europa.eu/fp7/ict/programme/fet/flagship/6pilots_en.html

Appendix 1 - Agenda and project/studies representation

- Welcome (EC) and introductory presentations
- Introduction and preparation for EC Research & Innovation Work-Programmes for 2013 and for Horizon2020 (EC).

Instruments for drawing research agendas (Rapporteur Oivind Lorentsen)

- Ageing Well / ICT research agenda (BRAID) – Filippo Cavallo
- SDDP methodology (CARDIAC) – Patrick Roe and Yannis Laouris
- W3C/WAI research forum (WAI-ACT) – Shadi Abou-Zahra
- AT research forum (ATIS4all) – José-Angel Martinez Usero
- *Discussion on research road-mapping instruments*

Potentials & Challenges regarding ICT for Accessibility and Accessible ICT (Rapporteur Gaëlle Calvary)

- Framework for e-Accessibility (AEGIS OAF) – Peter Korn, Maria Fernanda Cabrera
- Virtual User Modelling and Simulation (VERITAS/VUMS) - Margherita Antona
- Cloud based accessibility (CLOUD4all) – Gregg Vanderheiden
and José-Angel Martinez Usero
- Ambient Intelligence (UniversAAL) Juan Carlos Naranjo Martinez
- BNCI (TOBI) – José del R. Millán
- Assistive and Companion Robotics³ (Robot-Era) – Filippo Cavallo

Other Needs and Views – Wider perspectives (Rapporteur Moira Owens)

- Needs from deployment (e-Access+) – Carlos Velasco
- Needs from standardisation (M376⁴) – José-Angel Martinez Usero
- Disability communities view (EDF⁵) – Nadège Riche
- Industry view (Digital Europe⁶) – Peter Korn
- Current research axes in general HCI (SIGCHI, ERCIM, IFIP)⁷ – Gaëlle Calvary

Needs for EU to support e-Accessibility Research & Innovation (Rapport. G. Iannizzotto)

- Draft results from the study "Implication of Future ICT on e-Accessibility"
- Patric Crehan and Koumpis Adementios
- Discussions and conclusions
- New structure of EC DG-CONNECT, current Research & Innovation activities going under new Directorates "Media & Data" and "Sustainable & Secure Society" (EC)

³ a separate meeting is to be organised later on this topic, in particular for the Ageing support domain.

⁴ José-Angel Martinez Usero (Technosite) in CLOUD4all and ATIS4all projects

⁵ Nadège Riche (EDF) in eAccess+ project

⁶ Peter Korn (Oracle) in AEGIS project

⁷ Gaëlle Calvary (IMAG)