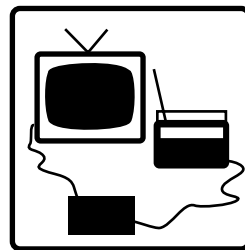
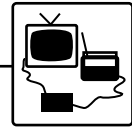


Chapter 7

Digital Broadcasting





Contents

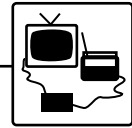
Introduction	7-2
Standards	7-3
Output form Projects	7-4
User Requirements	7-5
Conclusions	7-16

Introduction

In the digital broadcast area there are two main areas for distribution of digital content to the public. There is the Digital Audio Broadcast (DAB) system, which will and is already replacing the analogue radio. The other main distribution will be through the Digital Video Broadcast (DVB) system, which will replace the analogue TV using cable, satellite and terrestrial networks.

Both these new technologies will have the possibility to introduce new multimedia services as an addition to audio and TV. If they are well received in the market these services will have great impact on all users.

The development of these technologies is pushed forward by the industry. There is an ongoing struggle to come to a common platform, especially in the DVB area. Preliminary local specifications have been developed to be able to start introducing the services before a common set of standards has been agreed upon. The DVB Steering Board however reached a unanimous agreement in November 1999 on the Multimedia Home Platform (MHP), which is essential for the end-user.



Standards

Digital Audio Broadcast (DAB)

The standardisation of the DAB is pushed forward by the WorldDAB Forum and the Eureka 147 Origination. The WorldDAB Forum has over 200 organisations. The Royal National Institute for the Blind (RNIB) is one of its members. The standards are mainly produced by Comite de Normalisation Electrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI)

Some areas, which could have specific interest for a Design for All perspective, are the following:

Standards work	What
EN 50248 1997	Characteristics of DAB receivers
World DAB Module 5 Multimedia Radio	How will a multimedia radio be?
Eureka 147 TASK Force APPS (Applications)	How will a multimedia radio be?

Digital Video Broadcast (DVB)

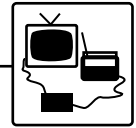
The standardisation in the DVB is pushed forward in Europe by the DVB project which is a consortium of public and private sector organisations the television industry. The consortium comprises over 200 organisations from more than 25 countries. The standards are mainly produced by the Joint Technical Committee (JTC) of the European Broadcasting Union (EBU), Comite de Normalisation Electrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI), but there is also work done under ISO and ITU-R.

Some areas, which have specific interest for a Design for All perspective, are the following:

Standards work	What
DVB - TAM 232	The specification of a standard platform for the DVB receiver - Multimedia Home Platform (MHP)
MHP or TAM group in DVB project	Built in Navigator -The way to guide the viewer to a special event
MHP or TAM group in DVB project	Electronic Programme Guide (EPG) -The program guide gives the user details on the content of the programs
ETS 300 743	Subtitling system - Different ways of subtitling

Other work

In the USA there has been work going on the also make proposals for standard in a Design for All perspective. The final report from the Electronic and Information Technology Access Advisory Committee (<http://www.access-board.gov/pubs/eitaacprt.htm>) is of special interest since it also recommends standards work in this area, but also the work from National Committee on Information Technology Standards Information Technology Accommodation Study Group (<http://w3.gsa.gov/web/m/cita.nsf/Portals/NCITS>). There are some projects, which has work with the access and use of digital broadcasting technology.



Output from Projects

In the TIDE program, the project AUDETEL 2 worked on how to implement the audio description in an extra sound track.

The Royal National Institute for the Blind (RNIB) has worked to identify areas in both DAB and DVB which could cause problems for person with a visual impairment, and have made recommendations for improving access for visually impaired people. Input to the requirements is provided by the RNIB.

NORDICT is a co-operation project between the institutes for technical aids in the Nordic countries, i.e. Danish Centre for technical aids for rehabilitation and education, Research and Development Centre for Welfare and Health (Finland), National Insurance Administration (Norway), The Swedish Handicap Institute, The State Social Security Institute (Iceland) and Nordic co-operation on Disability, a co-operation body under the government of the Nordic countries. The purpose of NORDICT is to contribute to the inclusion of the needs of older people and disabled people in European and international ICT standardisation. NORDICT analyses the consequences for people with disabilities of the technology and market development in the same ICT fields as are covered by the ANEC ICT Working group.

In May 1999, NORDICT made the following conclusions in the area of Digital services (NORDICT definition: interactive and possibly customised services such as public information to the citizen, entertainment, communication etc., where the digital technology provides subjective sorting of information or customised presentation of information. The interface for digital services are primarily TV or PC.)

In principle, the key aspects for standardisation identified are:

- Electronic programme guides (EPGs).
- Interoperable, expandable and upgradable systems.
- Encryption/decryption systems.

- Standards for what information to bring when to the user.
- Standardised hardware and software facilities. It would be advantageous if products of the same type had the same HW and SW facilities (plug-in facilities, user interface, on-line help, programming processes etc.).
- Horizontal standards for components, enabling the user to build a system out of products from different vendors.

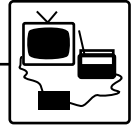
DTV Access Project at the National Center for Accessible Media (NCAM), Boston was established in 1998 as an inter-industry partnership to encourage implementation of Digital Television (DTV) services for people with sensory disabilities in USA.

The DTV Access Project endorses open technical standards and creates test materials to support the delivery of Closed Captioning and Video Description in professional and consumer digital television systems.

Trace is a research centre at the University of Wisconsin - Madison is another major actor which focuses on making off the technologies and more accessible for everyone through the process known as universal, or accessible design. TRACE is involved in Design for All in many areas, but for digital broadcast they have been working on guidelines for consumer products which is relevant for this area: (http://trace.wisc.edu/world/consumer_products). These guidelines have been used as input to the requirements.

Ongoing projects

In the Vth framework program there are at least three projects which are working in the field of new use of DVB technology: 11702 myTV, 11288 NEXTV and 12605 SAMBITS. These could be targeted to look into the needs of a broad set of user groups.



User Requirements

Locating and Physical Access



Home Environment

- The keypad is often difficult for users to locate.

Requirements

Standardisation



Physical

- None identified.



Auditory



Visual



Cognitive

- To find the keypad to the DVB, it should be a button on the DVB receiver which initiate a sound signal in the keypad.
- Not relevant as standard.

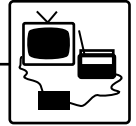


Dexterity

- None identified.



Combination



Physical Handling



Mobile Environment

- The DAB receiver should come in versions which are small and suit different needs.

Requirements

Standardisation



Physical



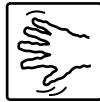
Auditory



Visual



Cognitive

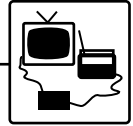


Dexterity



Combination

- None identified.



User Interface (UI)



Home Environment

- Standardisation of DVB MHP operating systems will make it viable to develop special software to improve the services for people with different special needs.



Mobile Environment

- The mobile DAB receiver must also come in versions which are accessible for persons with different types of disabilities.

Requirements

Standardisation



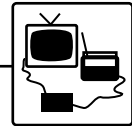
Physical

- None identified.



Auditory

- Both the DAB and the DVB terminal should providing a headphone jack to enable a person with impaired hearing to listen at high volume without disturbing others, to enable such a person to effectively isolate themselves from background noise, and to facilitate use of neck loops and special amplifiers.
 - Both the DAB and the DVB terminal should present auditory information continuously or periodically until the desired message is confirmed or acted upon.
 - Both the DAB and the DVB terminal should use accompanying visual cues and warnings by a sound, one component of which is of a mid-low frequency (500-3000 Hz).
 - Both the DAB and the DVB terminal should having auto-repeat or a means to repeat auditory messages.
 - The DVB service should be able to provide an audio description. The purpose is to provide extra commentary, in between the programme dialogue, to describe actions, facial expressions, scenery or anything that helps people to follow what is happening on screen.
- Required:
- The AUDETEL standard for audio description in DVB should be an European wide standard.



Requirements

Standardisation



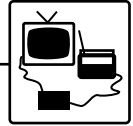
Visual

- Both the DAB and the DVB terminal should providing all important auditory information in visual form as well (or having it available). This includes any speech output as well as auditory cues and warnings.
 - Both the DAB and the DVB terminal should making letters and symbols on visual output as large as possible/practical.
 - Both the DAB and the DVB terminal should supplement colour coding with different shape or relative position coding.
 - Both the DAB and the DVB terminal should keep letters and symbols on visual output as simple as possible; using sans serif typefaces for non text lettering (e.g., labels, dials, displays).
- Required:
- There should be a standard for picture-in-picture signing in DVB.
 - There should be a subtitling standard on DVB.
 - There should be made a guideline on text fonts, colour contrasts and size of text for both DAB and DVB.



Cognitive

- Both the DAB and the DVB terminal should use simple concise language.
- Both the DAB and the DVB terminal should use common colour coding conventions in addition to textual or graphic labelling.
- Both the DAB and the DVB terminal should provide cueing on required sequences of action.
- Both the DAB and the DVB terminal should providing an easy exit that returns the user to the original starting point from any point in the program/sequence. (This exit should be prominent and clear.)
- Both the DAB and the DVB terminal should use visual/graphic indications for settings along with, or instead of, numbers or notches/dots.
- Both the DAB and the DVB terminal should providing a busy indicator or, preferably, a progress indicator when a product is busy and cannot take further input or when there is a delay before the requested action is taken.
- Both the DAB and the DVB terminal should use simple screen layouts, or providing the user with the option to look at one thing at a time.
- Both the DAB and the DVB terminal should hide (or layering) seldom used commands or information.
- Both the DAB and the DVB terminal should accompany words with pictures or icons.
- There should be a structure for the on-screen menu for both DAB and DVB terminals which make them logical and easy to use.



Requirements

Standardisation



Dexterity

- Interactive menus on the screen should use direct selection techniques where practical (selection techniques where the person need only make a single, simple, non-time-dependent movement to select).

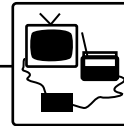


Combination

- Both the DAB and the DVB terminal should make information which is visually displayed, such as EPG, interactive menus for pay per view, for home shopping and home banking, e-mail etc, available electronically at an external connection point (standard or special port) to facilitate the use of special assistive devices (e.g., voice synthesisers, braille printers). The information should be available in an industry standard format.

Required:

- All the services offered on both the DAB and DVB terminal should be available electronically at an external connection point (standard or special port) to facilitate the use of special assistive devices (e.g., voice synthesisers, braille printers). The information should be available in an industry standard format.



Operation



Home Environment

- Standardisation of DVB MHP operating systems will make it viable to develop special technical aids to improve the access to these services for people with different special needs.

Requirements

Standardisation



Physical

- None identified.



Auditory

- Both the DAB and the DVB terminal should providing speech output to read or confirm the setting.



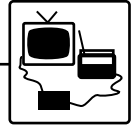
Visual

- Both the DAB and the DVB terminal should make lettering used for labels as large as possible/practical.
- Both the DAB and the DVB terminal should use voice output to "speak" the names of keys or buttons as they are pressed. (This capability would need to be turned on and off as needed.)
- Both the DAB and the DVB terminal should use high contrast between letters/graphics and background.



Cognitive

- Both the DAB and the DVB terminal should way the size of controls (also texture or shape) with the most important being larger to facilitate their location and identification.
- Both the DAB and the DVB terminal should providing controls whose shapes are associated with their functions.
- Both the DAB and the DVB terminal should limit the number of choices where practical.



Requirements

Standardisation

- Both the DAB and the DVB terminal should integrate group and otherwise arrange controls to indicate function or sequence of operation.
- Both the DAB and the DVB terminal should place the label on or, less preferably, immediately adjacent to, the control (this does not apply to scales, which should not be on the controls but on the background).
- Both the DAB and the DVB terminal should place a line around the button and label (or from button to label) to show association. The line should be kept away from any lettering especially if it is raised to avoid tactile confusion with the lettering.
- Both the DAB and the DVB terminal should use redundant labelling (e.g., colour code plus label).
- Both the DAB and the DVB terminal should avoid abbreviations in labelling (e.g., PrtScr, FF, C).
- Both the DAB and the DVB terminal should allow use of programmable function keys or using a "default" mode.
- Both the DAB and the DVB terminal should simplify required sequences, limiting the number of steps.

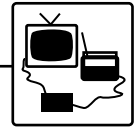


Dexterity

- Both the DAB and the DVB terminal should providing a standard connection point (connector or infra-red link) for special alternative input devices (e.g., eye gaze keyboards, communication aids).
- Both the DAB and the DVB terminal should make layout of controls logical and easy to understand, to facilitate tactile identification.
- Both the DAB and the DVB terminal should arrange controls in groupings which facilitate tactile identification (e.g., using small groups of keys that are separated from the other keys, placing frequently used keys near tactile landmarks such as along the edges of a keyboard and with texture coding).
- Both the DAB and the DVB terminal should use moving pointers with stationary scales.
- Both the DAB and the DVB terminal should use concave and/or non-slip buttons, which are easier to use with mouthsticks or headsticks. On flat membrane keypads, provide a ridge around buttons.

Required:

- The DVB and the DAB terminal should have a standard interface for keyboard and mouse.
- The numerical keypad should have the same layout as a telephone.



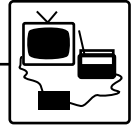
Requirements

Standardisation



Combination

- Both the DAB and the DVB terminal should provide sufficient space (at least 15mm) between controls for easy tactile location and identification as well as easier labelling (large print or braille).
 - Supplement colour coding with use of different button/key shape or letter/graphic labels.
 - Both the DAB and the DVB terminal should provide multi-sensory indication of the separate divisions, positions and levels of the controls (e.g. use of detents or clicks to indicate centre position or increments, raised lines,etc).
 - Both the DAB and the DVB terminal should provide multi-sensory indications of control status (e.g., in addition to a status light indicating "on," or providing an intermittent audible tone and/or tactilely discernible vibration).
- Standardise following user interface elements: shape/colour/icon/label for same function or action (within and across products and manufacturers.)



Adaptation to User Profile



Home Environment

- It should be possible to store different profiles if some of the family members have different needs.
 - The DAB and the DVB platform should support XHTML with the possibility to set up individual style sheets.
-



Mobile Environment

- It should be possible for the user to bring with him the profile to use on other DAB and DVB terminals.

Requirements

Standardisation



Physical

- None identified.
-



Auditory

- The DAB and the DVB terminal should have software to enable the listener to customise auditory output.
-



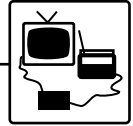
Visual

- The DAB and the DVB terminal should have software to enable the viewer to customise screen displays, for example to make the text bigger or to change the colour contrast.
-



Cognitive

- The DAB and the DVB terminal should have software to enable the user to customise screen menu and controls.



Requirements

Standardisation



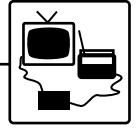
Dexterity

- The DAB and the DVB terminal should have software to enable the user to customise input devices.
-



Combination

- None identified.



Security of Operation



Home Environment

- All user of both DAB and DVB terminals should be able to access encrypted/secure information. The chapter on Smart Cards discusses this issue.

Requirements

Standardisation



Physical



Auditory



Visual



Cognitive

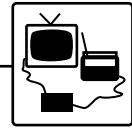


Dexterity



Combination

- None identified.



Conclusions

Standards required:

- The DVB MHP operating systems should be standardised.
- The AUDETEL standard for audio description in DVB should be a European wide standard.
- There should be a standard for picture-in-picture signing in DVB.
- All the services offered on both the DAB and DVB terminal should be available electronically at a standard external connection point - facilitate the use of special assistive devices (e.g., voice synthesisers, braille printers). The information should be available in an industry standard format (e.g. XHTML).
- The DVB and the DAB terminal should have a standard interface for keyboard and mouse.
- It should be possible to store different profiles if some of the family members have different needs.
- It should be possible for the user to bring his/her profile to use on other DAB and DVB terminals.
- There should be a structure for the on-screen menu for both DAB and DVB terminals which make them logical and easy to use.
- The numerical keypad should have the same layout as a telephone.
- Standardise following user interface elements: shape/colour/icon/label for same function or action (within and across products and manufacturers).