# The Portuguese Experiment within the IBCoBN Project

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***Resumo*** **- Este artigo apresenta a Experiência Portuguesa realizada no âmbito projecto IBCoBN do programa ACTS cujo principal objectivo foi o da utilização de redes CaTV como suporte de serviços interactivos. Em particular, a videotelefonia de elevada qualidade foi avaliada num conjunto de serviços de apoio remoto que tiveram como finalidade promover a independência de pessoas com necessidades especiais e permitir o desenvolvimento de novas estruturas de apoio comunitário.**

***Abstract*** **- This paper presents the Portuguese Experience within the IBCoBN project of the European ACTS program aiming to use CaTV networks as a communication infrastructure for interactive services. In particular, high quality videotelephony has been evaluated in a set of remote care services to support the continuance of independent living of people with special needs and to allow the development of new community support structures.**

## I. INTRODUCTION

There is a general consensus that advanced communications services will be the core of a new major wave of innovation, which will determine a structural evolution of the economy and society. In this context, the information and knowledge will be linked for a better economic performance and, at the same time, will allow the reshaping of the social interaction and the way to live, work and communicate. Concerning the care and support of people with disabilities, positive changes are expected and new services will be defined and implemented.

Videotelephony is one of the communication services that are being evaluated to support the care of people with disabilities. The authors have conducted several trials [1] using multimedia terminals based on personal computers with narrowband videotelephony codecs to support services for elderly, mental impaired and visual impaired. The results of these trials allow to foresee the potential of the videotelephony supporting services: videotelephony when used in remote care services for elderly people can allow rapid visual assessment of well-being and of problem situation for effective remote assistance which improves the feeling of safety and reduces the stress and loneliness; since people with intellectual impairment [2] has a simple and concrete concept of reality and many of them have speech and communication difficulties, the use of videotelephony could facilitate the possibilities to understand and interpret a message and also stimulates their communication abilities; even for the people with visual impairment, videotelephony can present an added value, allowing, for instance, a remote visual assessment of a specific training of perceptive facilities.

These groups of people with disabilities or just with the effects of ageing could make use of the narrowband videotelephony and have a very positive attitude towards the provision of advanced communication services, recognising the enormous benefit that would accrue to them. However, these trials have also shown that residential users do not easily accept a picture quality lower than the standard TV set: the narrowband videotelephony is only acceptable where there is no other alternative. Due to this reason, there is a strong motivation to explore the possibilities of the high quality videotelephony.

To study the application of high quality videotelephony to promote new ways to support the care of elderly and disabled people was one of the aims of the AC101 IBCoBN (Integrated Broadband Communications on Broadcast Networks) project [3].

## II. IBCOBN PROJECT

The IBCoBN project was the main cable project in ACTS (Advanced Telecommunications Technologies and Systems) Programme of the European Union and aimed to demonstrate the potential of CaTV networks as a future communication platform for integrated broadband services. IBCoBN provided to a representative group of cable operators the implementation of interactive high speed data services, namely high quality videotelephony,

on broadcast networks and identified and verified realistic scenarios and technical demands for transforming CaTV networks to Full Service Networks [4].

Distributive services are well known to CaTV operators and have been historically associated with coaxial cable spread by a tree-and-branch architecture [5]. However, concerning the interactive services there is a completely different scenario: there is a real demand for new technical developments that must consider services requiring symmetrical access and high capacity return channel. One of the most demanding areas for service delivery are conversation services (videotelephony, videoconference) where a 2 Mbps bandwidth may be required to meet user needs [4].

In order to adapt mature networks to symmetrical access it is possible to foresee evolution scenarios that use a combination of bandwidth extension, digitisation, coding and modulation techniques, introduction of fibre links and return channels possibilities. This evolution should allow the CaTV to support services to a heterogeneous group of final users, which implies a careful examination of the range of services and their technical demands.

Within IBCoBN, an international and multi-disciplinary consortium had elaborate different scenarios to establish the communication needs of residential users (including elderly, impaired and disadvantage people, and those in isolated communities), the needs of SMEs (Small and Medium Enterprises) in various sectors, and the needs related with health care, education and local Government institutions. Those scenarios were evaluated in experimental sites located in England, German, Belgium, France, Spain and Portugal. The users of the Portuguese Experiment, which was managed by the authors, were elderly people.

## III. PORTUGUESE EXPERIMENT

Advanced communication services could be used to implement and evaluate a combination of different organisational forms and effective service rendering, including social innovations in its implementation for a more adequate response to individual needs. Related with the services design there is a convincing challenge to develop working methods (for example, solutions focused in short term therapy, inter-relation activities, inter-help, group support).

We are aware that the most advanced technology would not be able to replace all the working needs of support among individuals. The role of the technology is to contribute for a job restructuring, an enhancement of information exchanges and training in the interconnection among individuals, rationalise data collecting and, most of all, promote an independent life for the citizens. These changes in the services can not be implemented from the outside, neither from the superiors nor even from isolated rules and regulations. In fact, it is necessary that technology is considered useful and a benefit for the support services. Changes in order to render the service will only be effective if all the people who work in the same services are convinced that the advantages of technology use are agents of change. To find out how high quality videotelephony together with data communication can be use as an agent to change the actual organisation of the welfare service and to promote their efficiency was the main goal of the Portuguese Experiment.

## IV. TECHNICAL SOLUTION FOR THE PORTUGUESE EXPERIMENT

Concerning the terminal equipment, it was considered essential a television based system independent of the transmission scheme, with the capability to provide two-way TV channel and be able of inter-operation with other services, applications and networks. Although the use of a centralised architecture where the head-end or network switch owns most of the "intelligence" has been analysed, the adopted solution was based on a PC terminal with a codec board [6]. The set-tops were provided by Daltek and each one comprised a H.320 video codec that supports a compressed audio/video bit stream, an integrated VGA-to-PAL, a TV-set, an hand-held infrared remote control for the user interface, a 10 Mbps Ethernet controller connected to a Terayon cable modem.

Concerning the delivery system, it was considered a solution able to support H.320 applications at bit rates starting from 384kbps up to 2Mbps. The bit rates from both the delivery system and the set-top box can be adjusted independently and manually via the user interface. The cable modem connected to each terminal modulated the bit stream from the Ethernet interface onto a dedicated bandwidth channel of the network. A corresponding modem on the head-end demodulated the original bit stream, which could be handled by an ATM switch.

The CaTV network that had been used was that of TV Cabo Portugal (the CaTV operator belonging to Portugal Telecom Group). The physical network was a monomode (150nm) fibre with the following channels' bandwidth: 111 – 750 Mhz (direct channels) and 5 – 65 Mhz (return channels). The amplifiers on the coaxial plant have diplex filters for the referenced frequency bandwidth and return plug-in amplifiers.

## V. RESULTS OF THE PORTUGUESE EXPERIMENT

The location of the Portuguese Experiment was the oriental part of Lisbon in order to exploit the capabilities of the communication infrastructure of the 1998 World Exhibition (Expo'98).

The seven set-tops (two prototypes and five from a commercial version) that have been acquired have been used at Mansão de Santa Maria de Marvila, Human Motricity Faculty, Portugal Telecom and at the home of elderly woman living alone.

Mansão de Santa Maria de Marvila is an Institution from the Welfare Centre of Lisbon and Tagus Valley where a large number of elderly and disabled persons are attended by several services, such as hospital wards, home for the elderly, day care centre and domiciliary support. The Faculty of Human Motricity, located 20 km from Lisbon, was the Service Provider. Finally, the set-top of the Portugal Telecom building located at the entrance of the World Exhibition EXPO'98 was used to demonstrate the IBCoBN scenarios both to the mass media and to various groups of visitors, namely the ACTS Management Committee, the Portuguese Minister of Science and Technology and the Portuguese Minister of Health.

The user participation in the Portuguese Experiment occurred in 1998 in parallel with the Expo'98. The users had performed daily sessions with 20 to 30 minutes, which occurred in a schedule arranged according to the availability of the users and technicians.

The services evaluated during this experimental period had recreational and therapeutic goals that were achieved through skills aimed to promote mainly the maintenance in the daily living activities and the maintenance of interests. The activities allowed the training of cognitive and visual abilities, joint mobilisation, improvement of cardio-respiratory functions and the participation in a singing group. The end users have been 19 elderly persons from Mansão de Santa Maria de Marvila, distributed by the referred services, according to their interests.

The services evaluation have been reported elsewhere [7]. However, considering the immature state of the technology that was used, an evaluation related with the technical issues was also performed. There were several evaluation forms performed on a daily basis:

1. Programme Contents - Register of the similarities/differences of the users performances in the face-to-face situation and at distance situation.
2. Usage Procedures - Evaluation of the users performances in the usage of the procedures to establish, finish and accept a connection.
3. Equipment Performance - Register of the technical difficulties related with the quality of sound and image, establishment of the connection, functionality of the hand-held infrared remote control.

Two different moments of evaluation have been performed and the respective results are presented in Table 1 and Table 2.

In the first moment the technical difficulties lead some users to loose their motivation in participating in the sessions, because those technical problems also increased their difficulties in the usage of the equipment and performing the activities proposed. This lead the users to take to themselves the responsibility for the difficulties. It has been difficult to motivate them to test the second moment (which has been performed after an optimisation of the terminal equipment), because they were afraid to go through the same difficulties. We verified that those who participated in the second moment enjoyed the sessions and the usage of the technology worked out as a valorisation for them.

| **First Moment** |
|---|
| 1. Programme Contents<br>Similar results in the users performances in face-to-face and at distance situations, with the exception of spatial orientation - more difficulties in the distance situation. |
| 2. Usage Procedures<br>Difficulties in the usage of the remote control and in remembering the sequence of the procedures - need for cues and verbal help and even physical help sometimes. |
| 3. Equipment Performance<br>Image: loss of definition in movement situations.<br>Sound: echo and noises and loss of definition, during the session.<br>Connection: the connection took about 2 minutes to establish; delay in sound and image transmission, even when only selfview was used. |

Table 1- First evaluation moment.

| **Second Moment** |
|---|
| 1. Programme Contents<br>Most users showed some evolution in the spatial orientation of their body segments and placing objects. There were still some difficulties in the left/right orientation. |
| 2. Usage Procedures<br>Enhancement of user autonomy in the usage procedures - written and graphical instructions provided. Major difficulties using the remote control. |
| 3. Equipment Performance<br>Image: better quality of the image even in movement situations.<br>Sound: though there was still some echo, the sound quality has improved.<br>Connection: the connection still took a long time to establish; the sound and image were synchronised. |

Table 2- Second evaluation moment.

The results that have been presented indicate that are still necessary some more accessibility adaptations, related mainly with the remote control and the usage instructions. Furthermore, both the codecs and cable modems still need a considerable improvement.

## VI. CONCLUSION

The work carried out within the Portuguese Experiment helped to know and solve the problems related with the use of CaTV networks for digital services. The Portuguese Experiment was useful to follow the technological evolution and to demonstrate the potential of the digital services.

The results of the Portuguese participation within IBCoBN gave the research partners a chance to continue a

research effort that can be translated into know-how transfer, including consulting and education.

For the operators, the IBCoBN experience was invaluable for a commercial exploitation of interactive services trough the CaTV network. Participating on IBCoBN brought to TV Cabo Portugal a required knowledge on interactive services provision over the CaTV networks, enforcing TV Cabo Portugal interest regarding this new services.

## VII. REFERENCES

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