



Visioboard

GAZE COMMUNICATION DEVICE FOR SEVERELY HANDICAPPED SUBJECTS



COO.S.S.
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VISIOWBOARD

Telematics DE4211

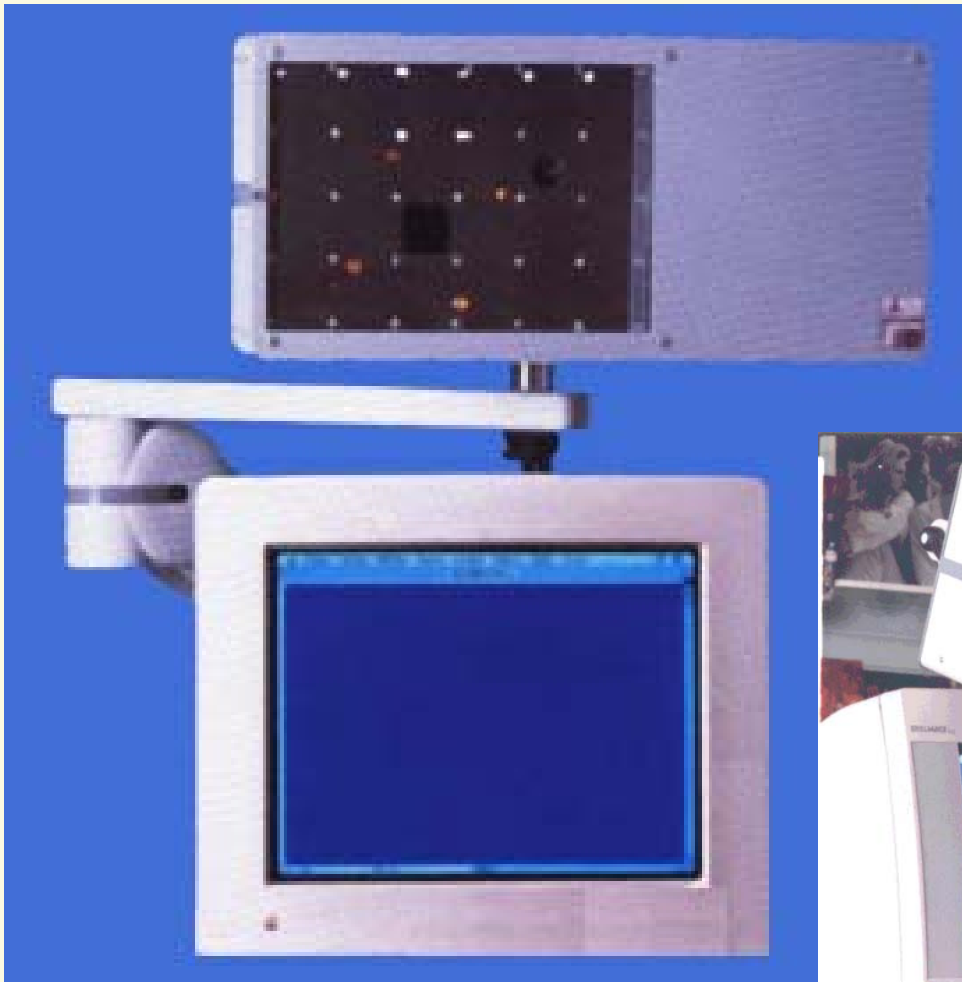
FINAL REVIEW APRIL 2001

GAZE COMMUNICATION DEVICE FOR THE SEVERELY HANDICAPPED



- Initial state of the art & user requirements
- Development of the demonstrator & demonstration
- Evaluations and results
- Dissemination & exploitation
- Future developments
- Live test by reviewers

Initial state of the art & User requirements



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1998 :

- Major constraints
- limited applications



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Initial state of the art & User requirements



constraints of the initial state of the art :

- reduced ambient light
- problems with small pupils
- no efficient tracking of head movements
- poor autonomy
- not a “see and point” interface (mouse emulation)
- compatibility with PC Windows environment
- problems for users lying in bed

Initial state of the art & User requirements

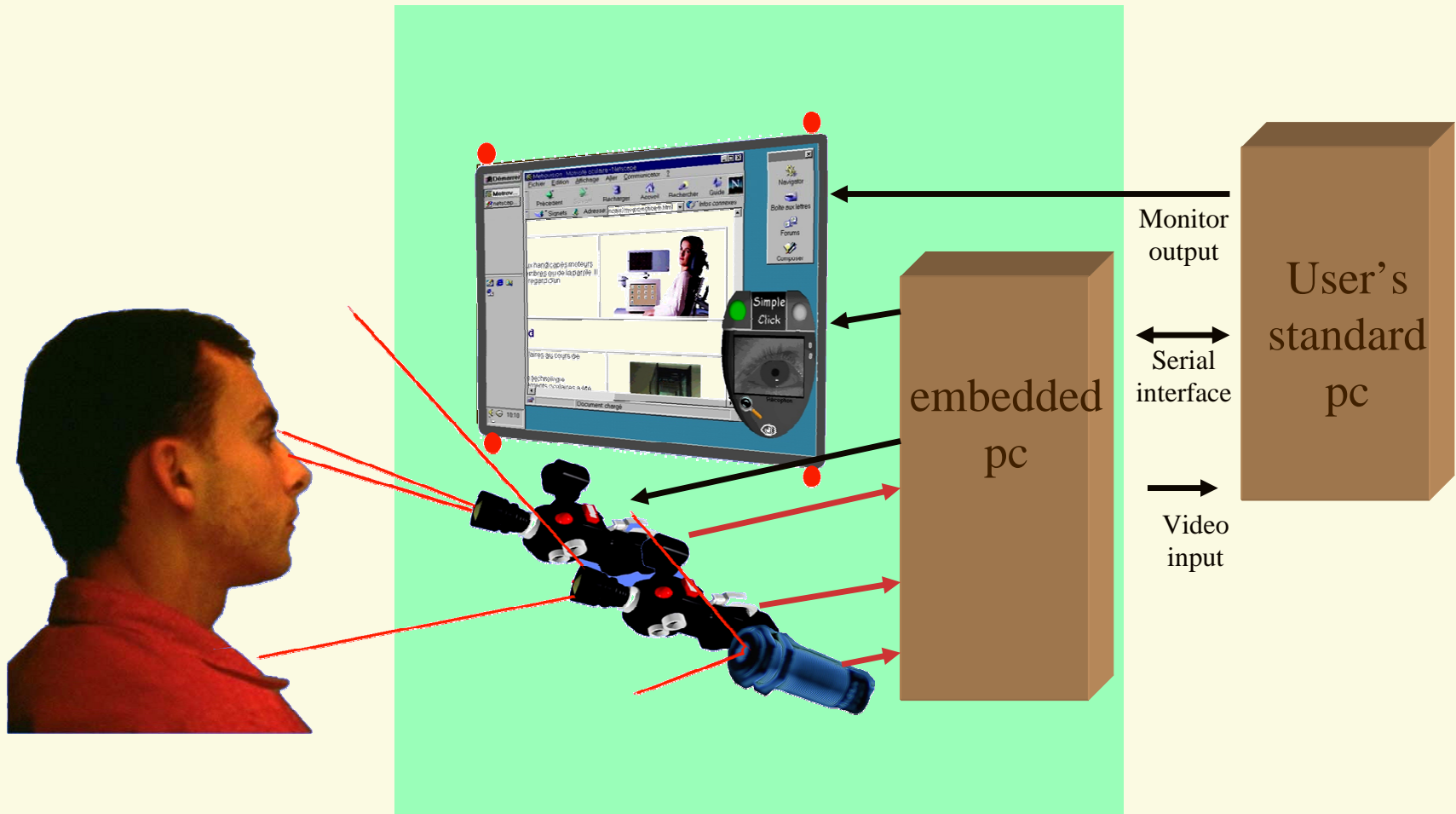


these user requirements implied major new technical developments that were not initially planned

the consortium chose to modify the project so as to find solutions to these problems :

- emulate the mouse interface
- redesign the analysis of eye images
- add a 2nd “head” camera in order to locate the eyes

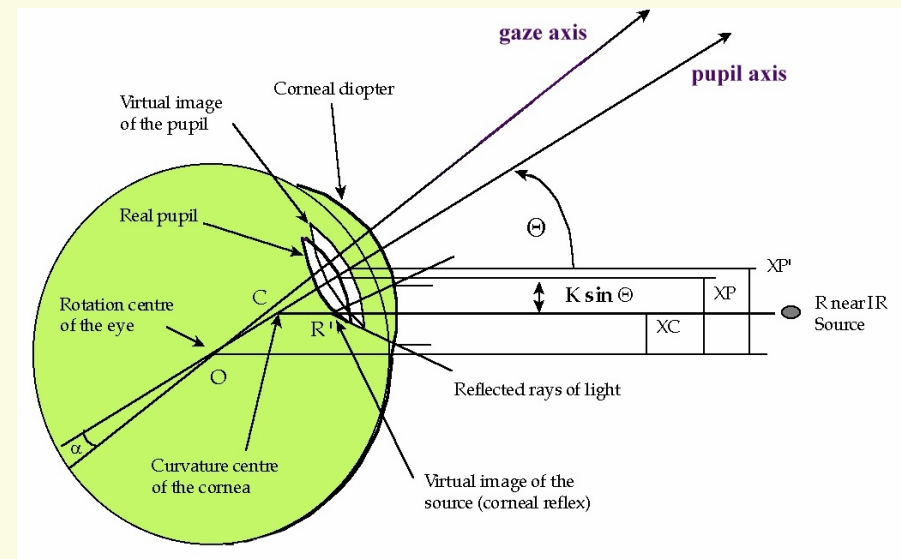
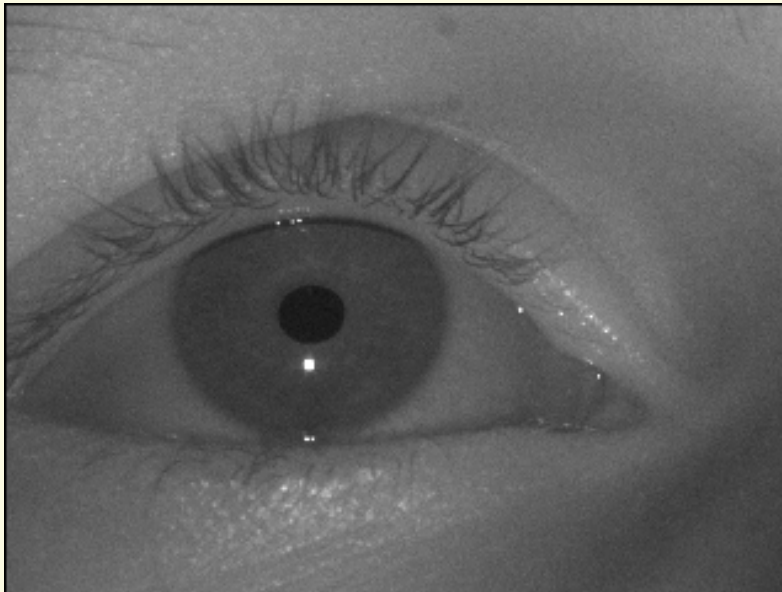
Development of the demonstrator



Development of the demonstrator



- New automated analysis of the eye image solution to small pupils and external lights



Development of the demonstrator



- emulation of mouse interface

cursor controlled by eye gaze

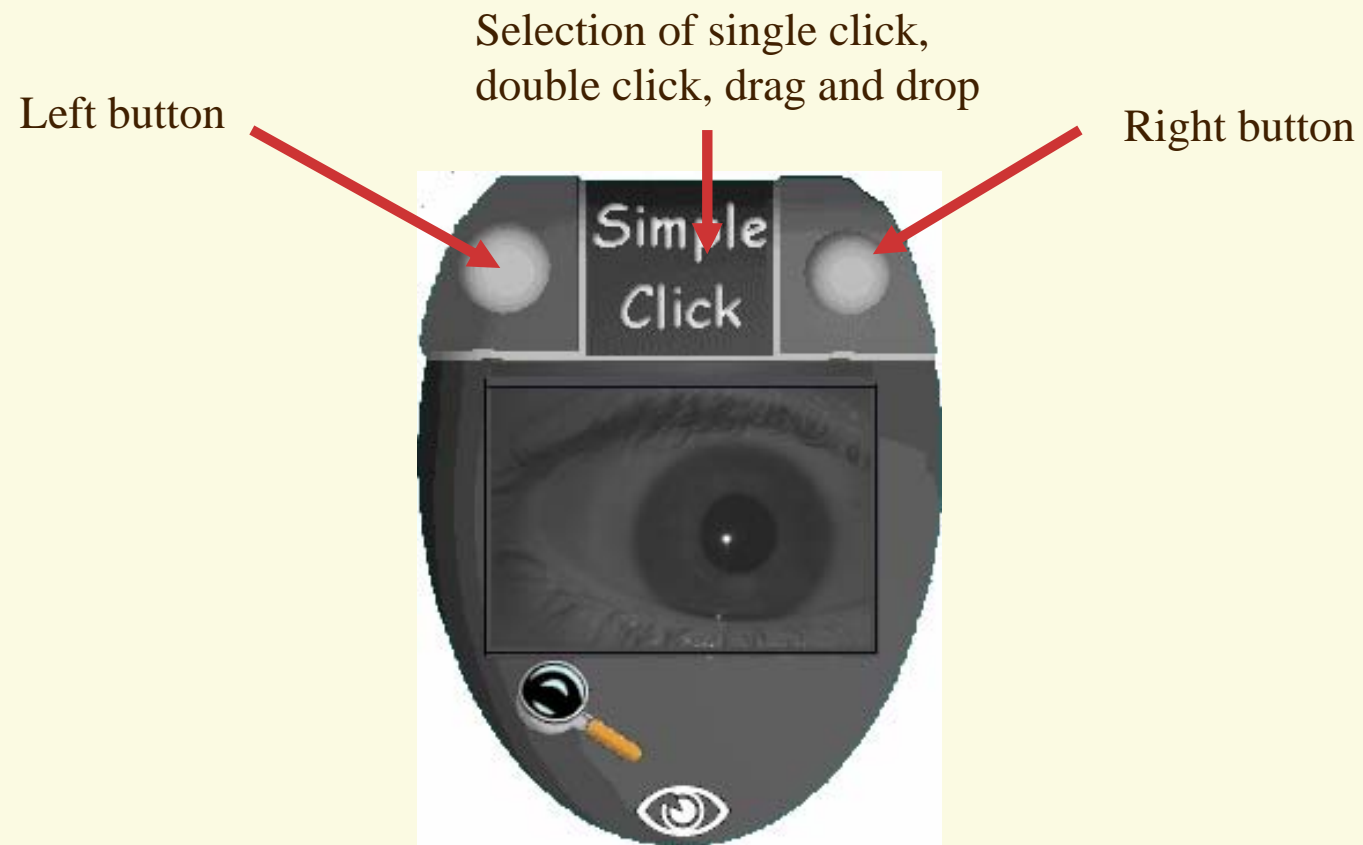
mouse events controlled by

- fixation duration,
- eye blinks or
- external contact

Development of the demonstrator



- emulation of mouse interface : mouse events and options



Development of the demonstrator



Standard applications :

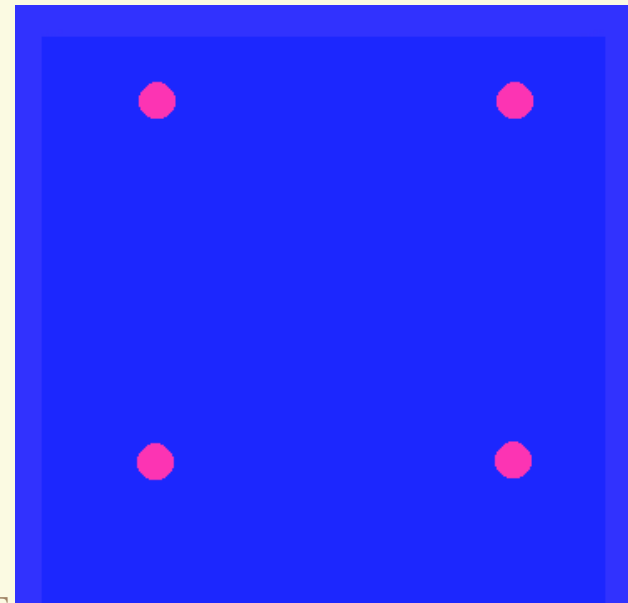
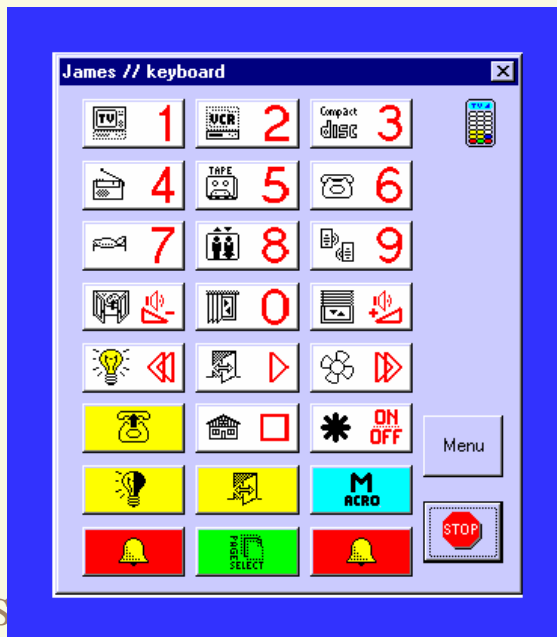
- text writing with text editor and on-screen virtual keyboard (Wivik)
- internet : browsing, email, chat
- multimedia : cdrom, movies, games, ...
- drawing

Development of the demonstrator



Specific applications :

- James II (FST) ==> environment control
- Visioboard - First steps (Adapth) => learning how to use Visioboard

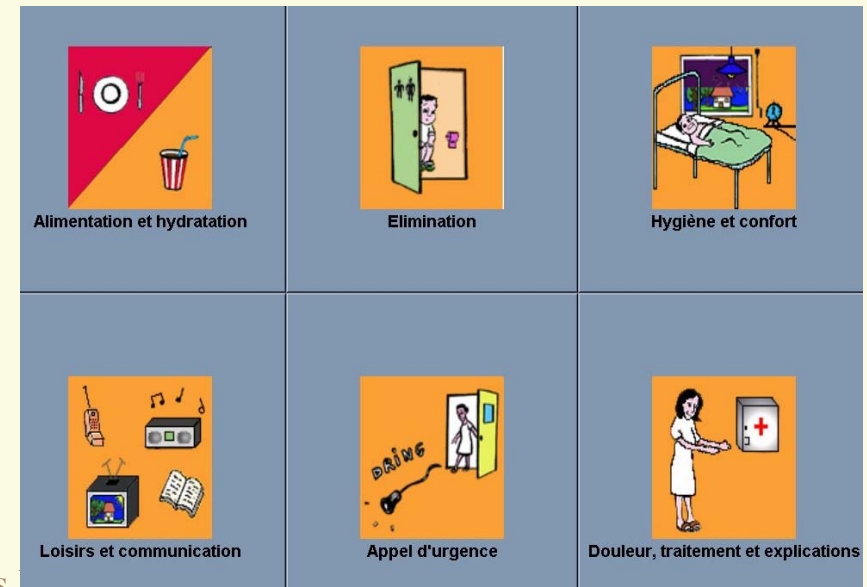
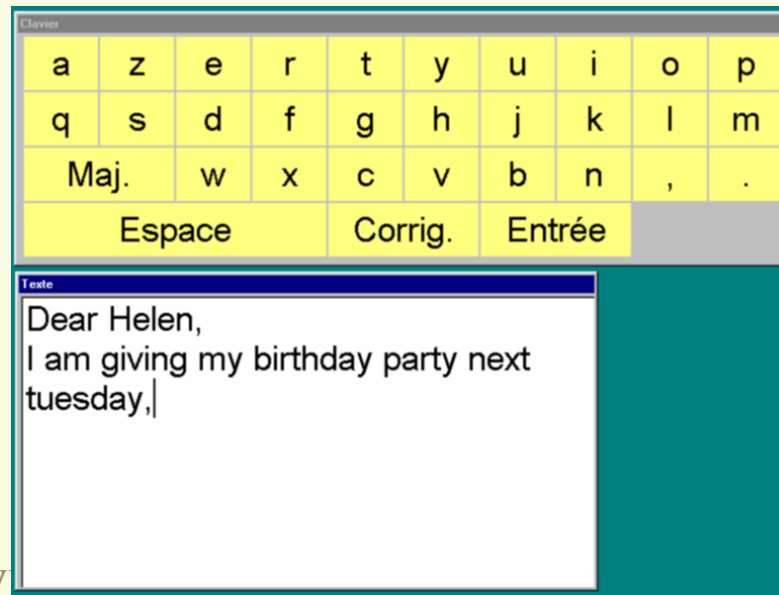


Development of the demonstrator



Specific applications :

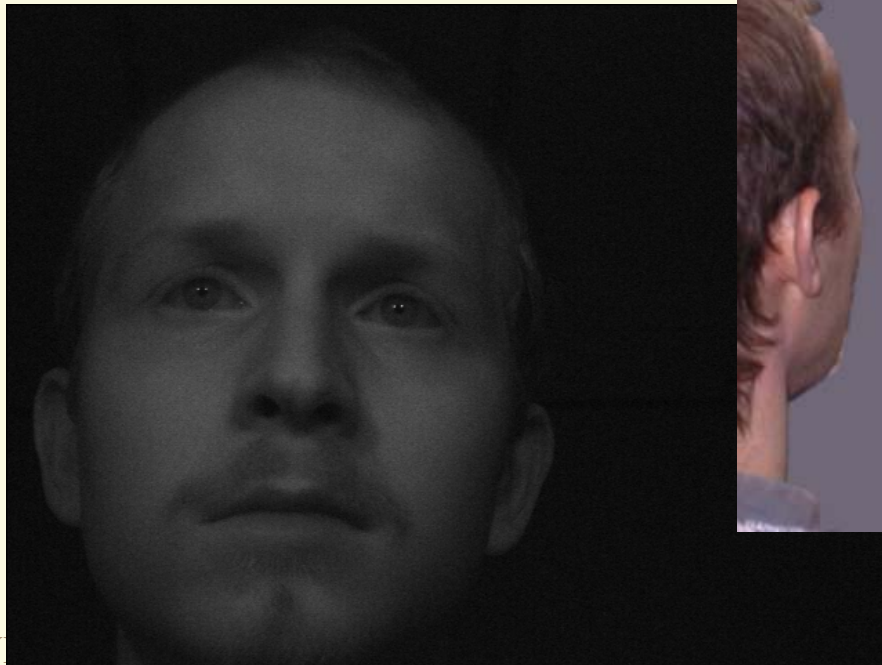
- Visioboard - Keyboard (Metrovision) => simplified interface
- Visioboard - Easycom (Chu Lille) => specific interface for intensive care



Development of the demonstrator



- Tracking of head movements in 3D
- Analysis of the head image



Development of the demonstrator



Reclining arm and support for adaptation to users in armchair and in bed



Evaluation and results



5 different evaluation platforms

- ADAPTH, Luxemburg (2 users)
- Cooss Marche, Italy (2 users)
- FST, Switzerland (4 + 16 users)
- Delta7, France (20 + 5 users)
- CHU Lille France (2 users)



Adapth, Luxemburg



Cooss-Marche, Italy



FST, Switzerland

Evaluation and results



- 7 : not able to use an existing communication device,
- 20 : not “efficient” with their present solution
- 3 : no need for a new alternative but useful feedback due to their past experience.



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FST, Switzerland

Telematics DE



Delta7, France

Evaluation and results



- 16 : in wheel chairs,
- 7 : in bed
- 7 : 16 users in wheel chairs



Chu Lille, France



Delta7, France



FST, Switzerland

Evaluation and results



Progressive evaluation

- **step 1 :**
ability to move the mouse cursor over different locations of the screen
- **step 2 :**
ability to point at graphic objects on the screen with decreasing size
- **step 3 :**
ability to write a text with a virtual keyboard
- **step 4 :**
ability to use the full features of the Windows interface

Evaluation and results



Results

- technically, Visioboard has reached the established project goal. In fact the developed “see and point interface” allows to use any mouse driven software on a Windows operating system platform. The achieved pointing precision allows the access to the new information and communication technologies as proposed in the project objectives.
- Visioboard can be used in different **positions and environments**. Its has been evaluated in a sitting as well as in a lying position in care centres, hospitals and at the user's home.

Evaluation and results



Results

- the installation and the learning phase require the **advice and on site presence** of an assistive technology expert.

- It has been verified that it is only possible to advice the Visioboard on **functional specifications** followed by a precise evaluation in comparison with alternative solutions.

Dissemination & Exploitation



The market :

definition of potential customers :

- 1- achieve better performance with Visioboard compared to any other suitable assistive device**
- 2- can receive support and advice from professionals in assistive technology**
- 3- have the financial capability to buy the system**