



PHARE¹ digital project: a summary

An independence enhancer for persons with intellectual disabilities

author: Vicente Sanchez-Leighton

date: october 1st 2007

The purpose of **PHARE digital** is to undertake the full design process of a specialized mobile digital assistant for persons with intellectual disabilities in order to optimize their independence in daily life.

Contact :

Vicente Sanchez-Leighton

Hyptique ; 13 cité Joly ; 75011 Paris ; FRANCE

Mobile : +33 (0)6 70 15 52 45

e-mail : vicente.sanchez-leighton@hyptique.fr

¹ *Phare* is a French word: it means *lighthouse* as well as *headlight*.

1. goals

1.1. first goal : reduce dependencies

Design, develop and evaluate digital and mobile assistive technologies for intellectual disability: **the PHARE digital device and tools will reduce dependencies.**

The PHARE digital device will be designed to aid persons with intellectual disabilities in their daily life. It will be built around **five main functional software and hardware components, interacting with the environment, with the user and with each other.**

1.1.1. functional components

- a configurable communications component with high quality sound and video

Beyond its use for telephony and visiophony this component will enable enriched communication patterns (including annotations and gesturing with the device) between PHARE digital users. In case of confusion or panic, this enriched communication will provide productive interaction with the user's professional, friendly or family caregivers. This component will also offer facilities for asynchronous communication (audio-video messages, « answering machine », etc...) and audiovisual captures for memory assistance.

- a configurable time management component

This component will assist the user with his time perception and his interactions with others: recall the passage of time and appointments, help in evaluating preparation time for a future event, etc...

- a configurable transportation and location management component

Using diverse location facilities (GPS, wireless infrastructure, etc...) and geographical databases this component will assist the user with his spatial perception and transportation needs.

- a framework for addition of daily life assistance components

This framework will enable the addition of user adapted plug-in components to help and supervise the user in his domestic activities and learning. These plug-in components will interact in real time with usual or home appliances. They will be developed by caregivers with the tools described further on. They will use recent interaction technologies like augmented reality. Examples: following cooking recipes (from ingredient

shopping to meal preparation), using the washing machine, cleaning home, what to do in case of blackout, etc...

- a user interface adaptation and configuration component

In line with the user's preferences and evolving capabilities this transverse component will enable fine adaptation by caregivers of the device's interaction mode. It will offer a large combination of graphical, tactile, oral, verbal and gesturing user interface channels.

1.1.2. *strategy*

The PHARE digital device development will be **based on today's high end mainstream PDA and smartphone hardware and software platforms**. We believe this approach offers optimal guarantees for a midterm (less than five years) productisation.

PHARE digital's technological environment: the project's impact will rely on – and will be emphasized by – a set of complementary technologies: **home control** (the availability for home appliances of a generic control port), **virtual reality** (the use of virtual reality environments for learning and practicing), **broadband wireless infrastructure** (data, voice, images, video), **Geographical Information Systems**, etc...

1.2. **second goal: tools for dynamic adaptation**

Design, develop and evaluate software and hardware dynamic adaptation tools for non-programmers. These tools will enable fine **adaptation of the PHARE digital device to the user's evolving needs and capabilities**.

1.2.1. *strategy*

These tools will enable caregivers to **improve the user's PHARE digital device "in the field" by adding help and supervision software plug-ins** (and sensors, if needed) as stated before. PHARE digital's most ambitious goal is to enable this "programming" by non-programmers who understand the user's needs and disabilities. The same tools will also be used by (specialized) teachers in the school curriculum of future PHARE digital users in order to prepare them for adult life.

A library of adaptable help and supervision plug-in templates and sensor outfits will be developed: it will constitute the basis of an **internet experience and tools sharing platform for caregivers**.

2. partners and financial scenarios

The project will need a consortium of diverse and complementary partners. Several prospects have been approached: some have already declared interest in the project others are still evaluating.

The main financial scenario for the project is targeting the european commission's 7th framework programme (FP7) "challenge 7: Independent Living and Inclusion" (http://cordis.europa.eu/fp7/ict/programme/challenge7_en.html). In case FP7 calls were not in line with the project's goals alternative multi-national scenarios have been considered.

2.1. partners representing users and caregivers

The following associations have participated in the project's preparation since its inception:

- trisomie 21 France federation of associations (www.trisomie21-france.fr);
- trisomie 21 Mayenne association (member of trisomie 21 France), French pioneers of independent living assistance for persons with intellectual disabilities. The experience of their PHARE service was an important initial motivation for the project (and its name, PHARE digital is a reminder of this).

Their input will be crucial in the design and evaluation aspects of the project.

2.2. partners representing institutions

The French national institute for research and training on adapted education for youth with disabilities (INS-HEA, <http://www.inshea.fr/>) is an **active partner** of the project and, considering its position in the national institutional network, a major asset for us. They will concentrate on issues concerning the use of PHARE digital in school curricula for persons with intellectual disabilities.

2.3. partners representing academic research

We welcome the contributions of researchers from diverse specialties and countries. We have contacted teams that have already worked in similar subjects and some are already **active partners** in the project:

- PSITEC research team, Université Charles de Gaulle - Lille 3 (yannick.courbois@univ-lille3.fr). They have worked in the field of

spatial orientation for persons with intellectual disabilities ;

- CEIT (<http://www.ceit.es/mechanics/>) experts in augmented reality techniques for mobile devices ;

Others are discussing the project and their eventual implication:

- CERTEC, University of Lund, Sweden (<http://www.english.certec.lth.se/>). Back in 1993, in the context of their ISAAC project (<http://www.certec.lth.se/doc/whatisaac/>), they developed a prototype of a very interesting idea that was unfortunately hindered by technological shortcomings prevailing at the time for mobile devices;
- The Center for Lifelong Learning & Design, University of Colorado, USA (<http://l3d.cs.colorado.edu/research/projects.html>). Based on CERTEC's ISAAC experience, but more recently, they developed assistive technologies for transportation and daily life assistance;
- The Copenhagen Institute of Interaction Design, whose current director took part in the COGNIPOD project (http://projectsfinal.interaction-ivrea.it/web/description/ip_cognipod_05.html) at the Interaction Design Institute in Ivrea, Italy. This project targeted the design of a "cognitive prosthesis" similar to PHARE digital.

2.4. partners representing software and hardware industry

We are actively prospecting industrial partners like Nokia, HTC, Ericsson, Apple, Fujitsu-Siemens, Microsoft and France Telecom.

Concerning complementary technologies (see "PHARE digital's technological environment" in 1.1.2) contacts have been initiated with EDF (Electricité de France) and the TERRA NUMERICA project of the CAP DIGITAL French competitive cluster in Paris.

Finally, Hyptique, founding promoter of the project, is specialized in projects with high interactive added value, both in application design and content creation. The company initially started up the French interactive design community through the Numer international events and has been active on that front ever since with research, creative and teaching activities.

3. results

The first and main yield of the project will be the **blueprint for a midterm productisation of PHARE digital**, in collaboration with the project's industrial partners.



The project's approach is definitely pragmatic: the need for such a device is real and developing and we want to address it as rapidly as possible.

The project will also measure and document **the efficiency of its industrial partners' software and hardware platforms** with respect to persons with intellectual disabilities.