Assisting personal guidance system for people with visual impairment

Newsletter N.1
March, 2012

Welcome

In this first newsletter, we include an introduction to the project ARGUS for those who are new to it and want to know which are its goals, who is developing, what are the expected results.

For those who already know about the project, there are updates on the status of the project tasks and the dissemination activities, and short articles on relevant issues.

Summary:

- Introduction to ARGUS.
- Identification of requirements.
- Holophonic sound tests.
- Dissemination activities.
- Miscellanea.

www.projectargus.eu
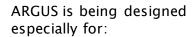
Introduction to ARGUS

The main goal of the ARGUS project is to develop innovative tools which could help blind and visually impaired people to move around autonomously and confidently. They could be used also by people working in low-visibility and hazardous conditions.

The ARGUS system will consist primarily of a user-friendly portable satellite-based navigation device with acoustic and haptic user interfaces enabling users to obtain a 3D spatial insight of their surrounding environment, and providing continuous assistance to follow a predefined path in urban, rural or natural areas.

ARGUS will act like a "leading climber", providing users with a virtual safety rope guiding them along a track, based on the usage of non-visual interfaces to let the users build and maintain a mental map of the path to be followed.

The system will allow uploading into the device pre-recorded tracks, paths, and points of interest. Once on-route, all what the user has to do is follow the continuous acoustic guidance and instructions provided by the device.

ARGUS is being designed especially for:

- **Blind and visually impaired** people performing non-critical outdoor activities.
- **Emergency and Rescue Teams** and Health Professionals.
- People practicing scientific or sport activities in **reduced visibility** or hazardous conditions.

Satellite navigation systems provide information mostly through graphical displays or verbal output, which are not convenient for people who cannot see or have to operate in environments where verbal instructions could interfere with other external sounds.

The challenge that ARGUS aims to meet is the integration of advanced user interfaces based on generated acoustic and haptic signals, with minimal interference on the user's perception and operation so that he/she can move around autonomously based on a three-dimensional mental map of the path to follow and the key features of the surrounding environment.

ARGUS will lead users along a secure path, warning on the risks that may find along the path and ensuring that the user doesn't deviate from the safe route.

Users will be able to download pre-recorded tracks from an accessible Website where they will find additional services, such as a social network that will enable them to share data and experiences, and will facilitate integration and collaboration.

Identification of requirements

In an early stage of the projects, all the partners collaborated capturing the user requirements **using questionnaires and personal interviews** with a sample of final users from different countries.

OK–Systems applied some interviews during a one day tour accompanying the Mountain Group of the Spanish National Blind Organization (ONCE), having the opportunity of guiding the back side of the directional bar used to navigate in complex mountain tracks, getting a real guidance experience and observing the interests and limitations of the users concerning autonomous navigation. During the mountain tour, visual impaired experienced mountaineers had the opportunity of testing the 3D binaural acoustic perception.

After collecting and analyzing the inputs, a first version of the requirements for the ARGUS system.
In March has been reviewed by final users and subject experts during a "**Requirements Workshop**" organized by The 425 Company, with the purpose to validate and refine them.

Key features of the ARGUS System

- PDA size. Weight: approximately 300 gr.
- Battery autonomy: minimum of 8 hours.
- Multimodal interfaces (acoustic & haptic).
- Satellite–based user position and orientation.
- Itinerary management in real–time.
- Open earphone allowing users to receive verbal and holophonic mapping information, without overriding ambient sound.
- Permanent assistance from a call centre.
- Web–based social network allowing users to download tracks, points of interest and alerts, to upload collected data, to share experiences and get support from other users.

Holophonic sound tests

During March 2012, all the ARGUS partners performed intensive sound tests aiming to demonstrate that the **holophonic sounds** could be used to help people with reduced vision to perceive clearly the direction and distance of the sound source.

Validation of headphones

Different models of **headphones** are being evaluated by all the ARGUS partners with the goal to validate the non-disturbance of general hearing.

It's critically important for the project to demonstrate that it is possible to listen sounds produced by a device without blocking or interfering with other sounds from the environment because this would imply risks that could compromise the safety of the users.

Some of the headphones tested were based on the bone sound conductivity (an effect discovered by Ludwig van Beethoven when he was getting deaf and found that holding a stick with his mouth he could perceive better the sounds of his piano).

Holophonic sounds create the illusion that sounds produced by a stereo headphone emanate from specific directions and distances. Holophonic technologies reproduce the interaural differences (arrival time and amplitude between the ears).

Using the holophony the users perceives 3D sound positioning.

The main goal of this project is to guide the visually impaired person through a route (controlled via GNSS) giving the sense of 3D navigation.

Dissemination activities

Past events

▶ ARGUS was represented by Siemens on 18th January at **Guide4Blind** "*Das Soester Modell*" (The Soest model) *Neue Wege für und mit dem Tourismus auch für blinde und sehbehinderte Menschen* (New ways for tourism and for the blind and visually impa... people).

http://www.nav4blind.de/

Future events

▶ A paper about ARGUS was submitted by CEIT to **REAL CORP 2012** 17th International Conference on Urban Planning and Regional Development in the Information Society GeoMultimedia 2012
14–16 May,
Schwechat (Austria)
http://www.corp.at/

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