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# ARGUS “Assisting perSonal Guidance System for people with visual impairment”

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## REAL CORP 2012



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Company: Vicomtech-IK4

Session: Barrier-Free, Accessible, Intelligent Urban Environments

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## List of content

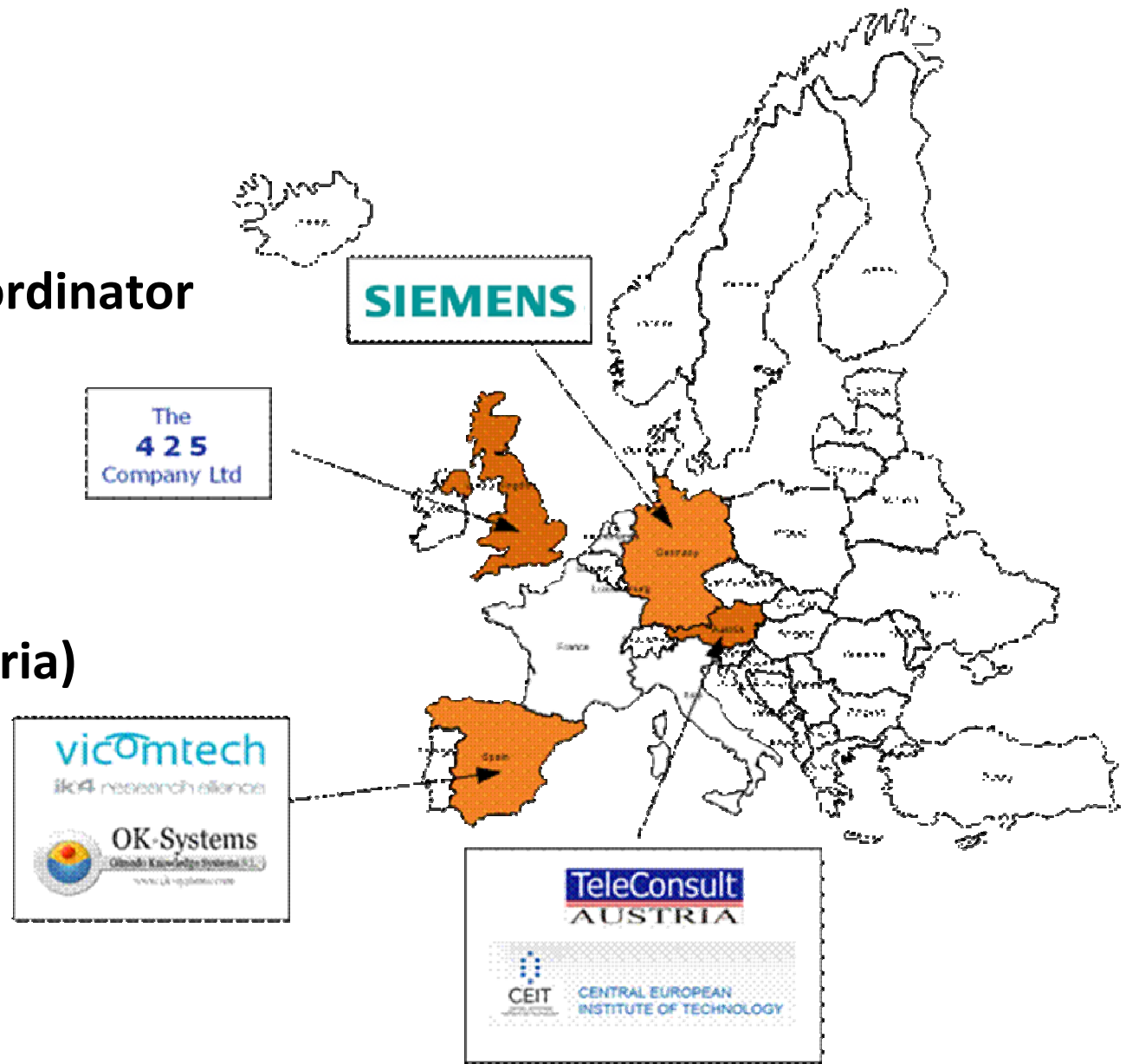
- Consortium
- Motivation
- Overall Goal
- ARGUS Guidance Concept
- Binaural audio concept
- System Operation and architecture
- Outcomes
- Overall Work Plan
- Upcoming steps

# Project

- **Project acronym:** ARGUS
- **Full Name:** Assisting personal guidance system for people with visual impairment
- **Grant agreement no:** 288841
- **Call ID:** FP7-ICT-2011-7 | ICT-2011.5.5: ICT for smart and personalised inclusion
- **Duration:** 30 Months
- **Start date:** 01.10.2011
- **End date:** 30.03.2014
- **Funding scheme:** STREP
- **Consortium:** 6 partners
- **Project website:** <http://www.projectargus.eu/>

# Consortium

- **VICOMTECH-IK4 (Spain) - Coordinator**
- **CEIT ALANOVA (Austria)**
- **OK SYSTEMS (Spain)**
- **SIEMENS AG (Germany)**
- **TELECONSULT AUSTRIA (Austria)**
- **THE 425 COMPANY (UK)**



## Motivation

- Visually disabled people have striking needs for trustful navigation systems providing them efficient mobility services, mainly considering safety and autonomy.
  
- Limitations of existing products and solutions:
  - Lack accuracy and integrity: they do not provide a suitable and efficient man-machine interface adjusted to this user segment, or rely on costly infrastructures.
  
  - Are based on GNSS providing information through graphical displays or verbal output.
  
  - Are not convenient for people who cannot see or have to operate in environments where verbal instructions could interfere with other external sounds.

# Motivation



People with visual impairment require guidance support in outdoor activities.





# Motivation



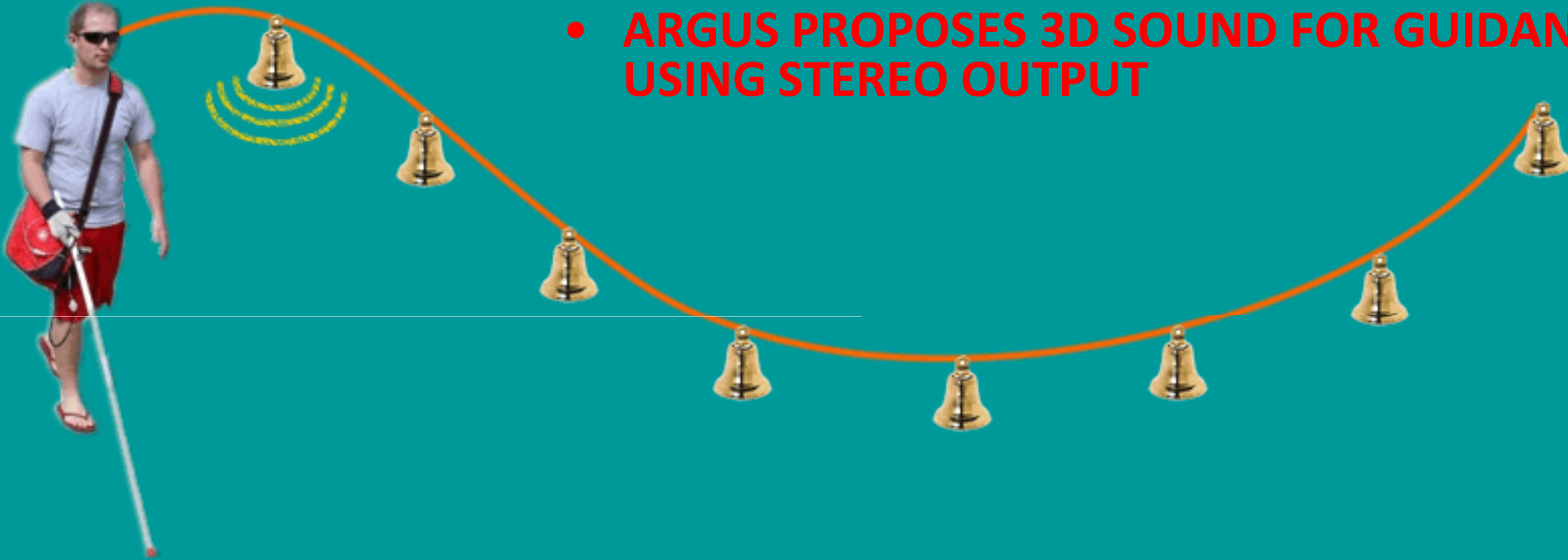
## Overall Goal

- **To develop a GNSS-based mobility service for people with impaired visually capabilities, to guide them along a pre-defined track, using acoustic and audio-haptic signals, which meets the level of accuracy and reliability they need in urban environment for improving their day-to-day life autonomy**
  
- **Other outcomes:**
  - 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.
  
  - Implemenation 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.
  
  - Retrieve benefits from navigation services to increase the level of positioning accuracy and reliability as well as the level of service availability.



# ARGUS Guidance Concept

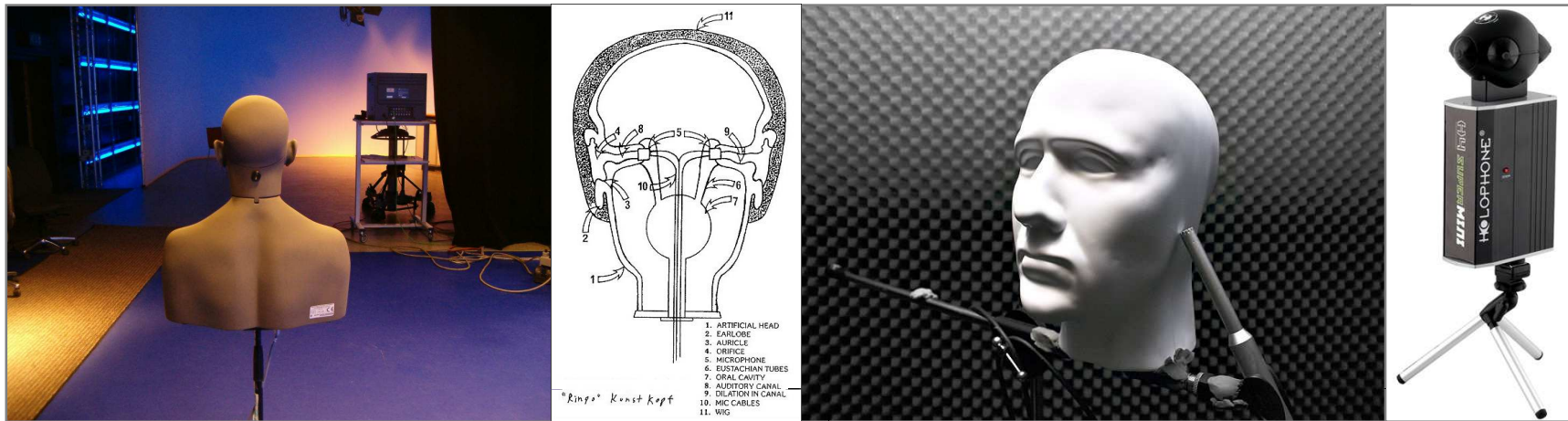
- The sequence of the bell rings allows any person to build a mental map of the path.
- Although the sound is the same it is perceived in a different way depending on the distance and orientation
- **ARGUS PROPOSES 3D SOUND FOR GUIDANCE USING STEREO OUTPUT**



# Binaural audio

What are binaural sounds?

Binaural technologies reproduce the interaural differences (arrival time and amplitude between the ears).

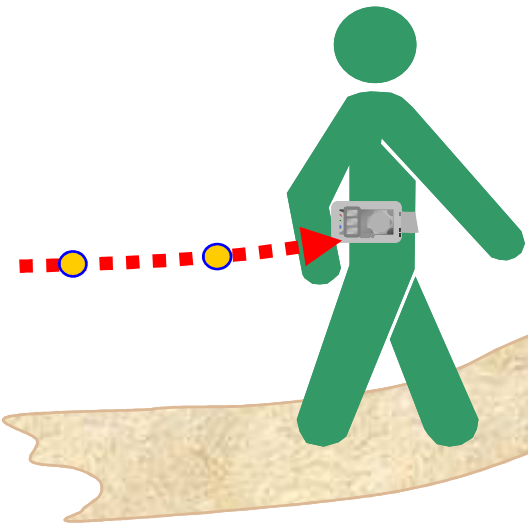


Binaural sounds create the illusion that sounds produced by a stereo headphone emanate from specific directions and distances in the surrounding space.

# System Operation

## Obtaining Track Data

### A. Track Recording



### B. Track on Map Processing

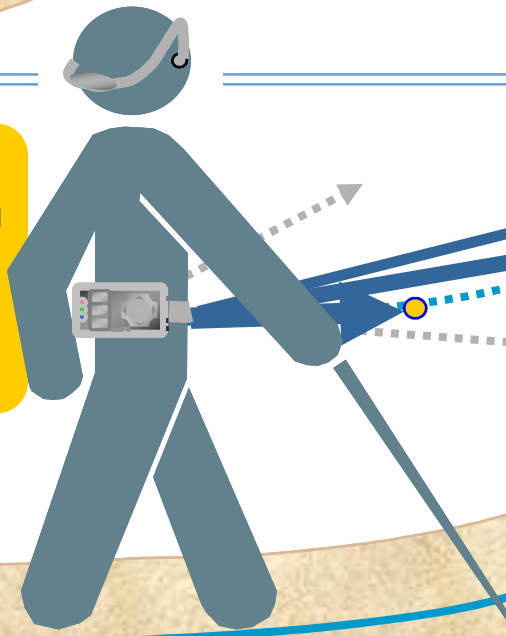


### C. Track Server



GPX data (Tracks and Waypoints) can be obtained through different options

GPX file is loaded in the user terminal and activated for track guidance to reproduce the path and reach the destination.



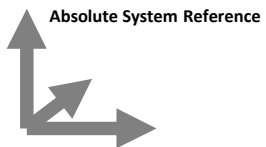
User System Reference

GPX data recorded and activated



Optional Head Mounted

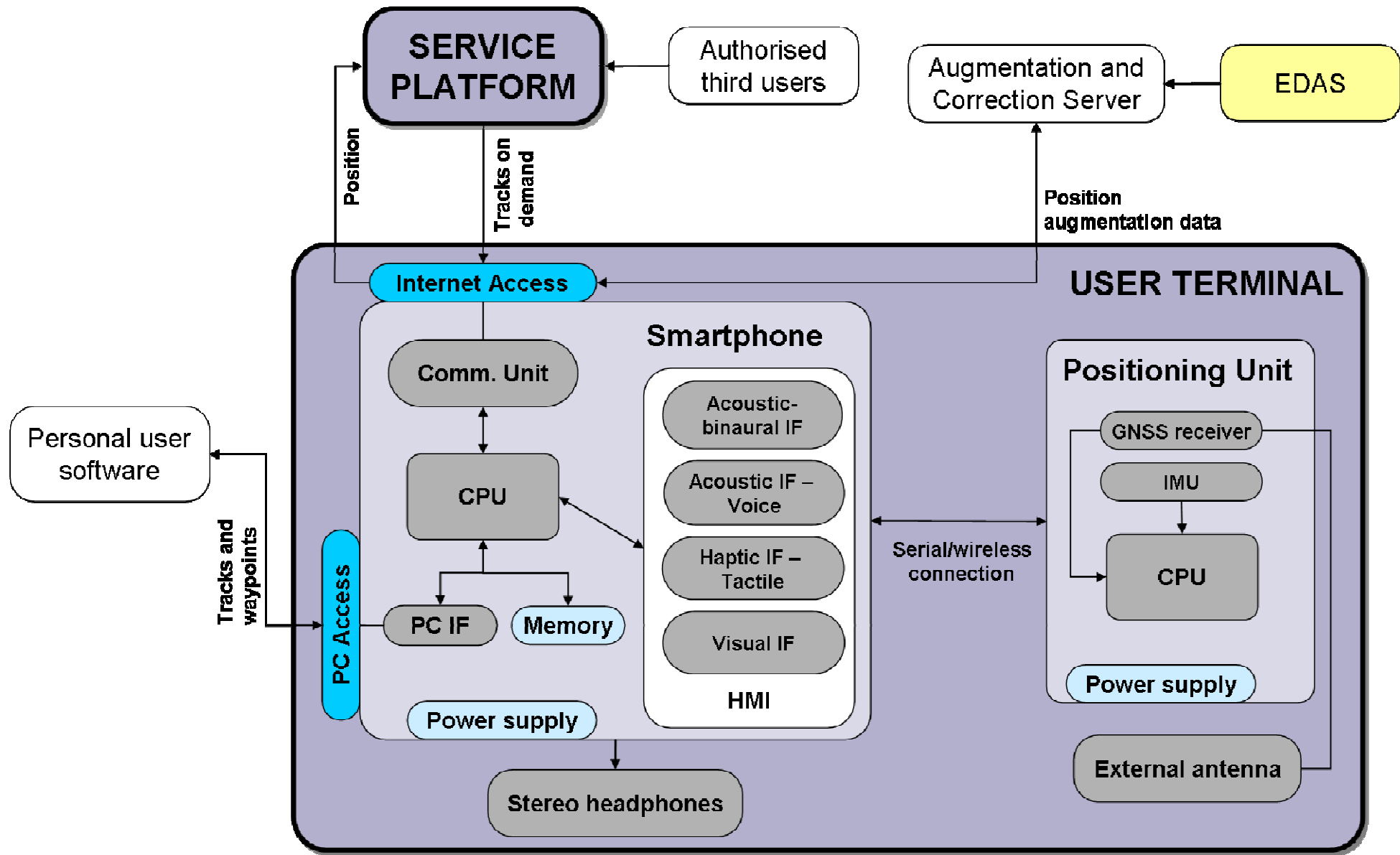
Guidance instructions are provided based on user position and orientation obtained through GNSS and electronic compass



## Track Recreation



# System architecture

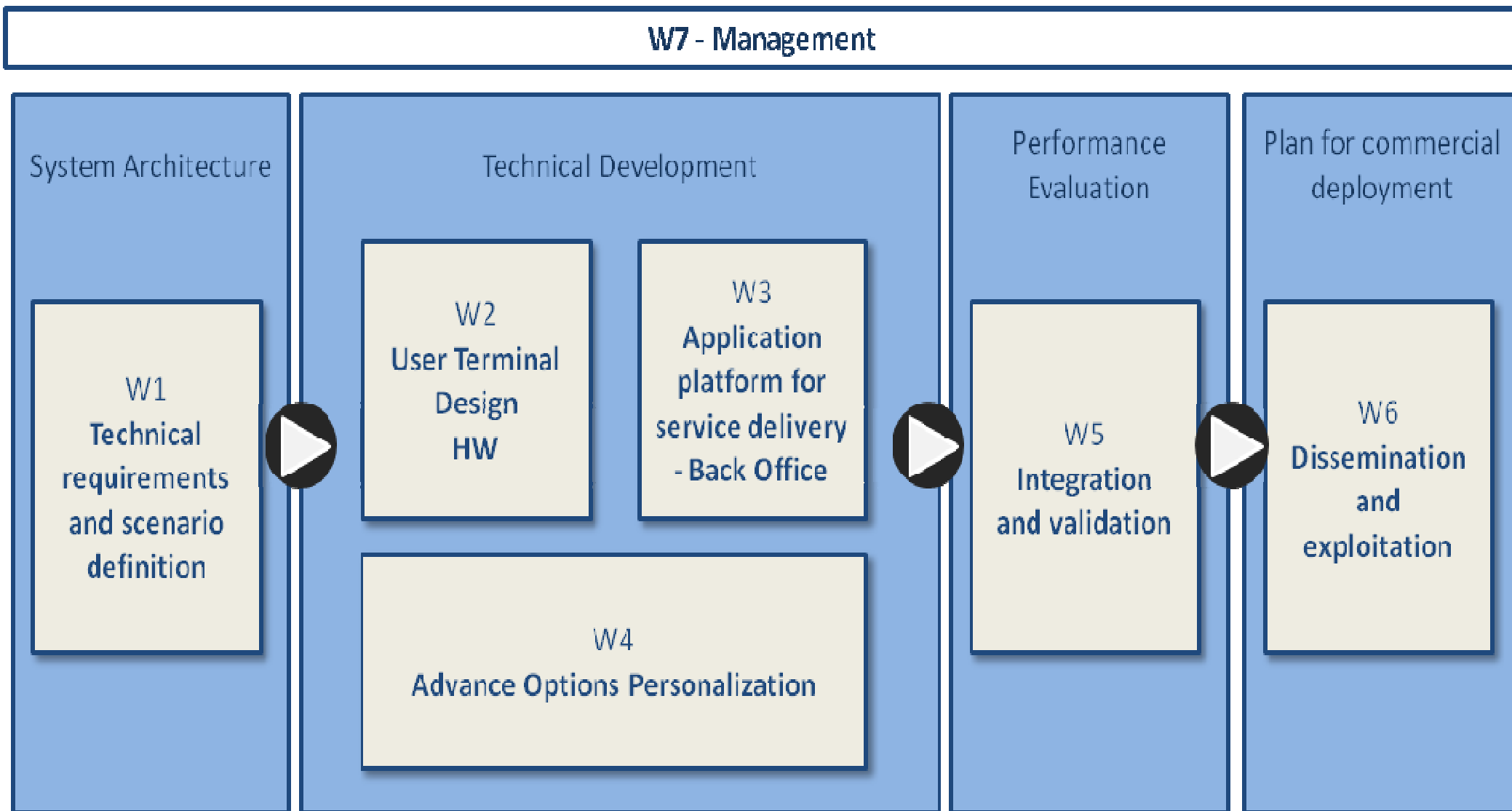




## Argus outcomes

- An intelligent guiding portable device to support people with visual disabilities as well as other collectives such as people working in low visibility and hazardous situations or the ageing population.
- To build up a pre-commercial navigation product which guides target users along a secure, pre-defined track. The positioning component will use satellite based positioning.
- Development of innovative tactile signals, acoustic and audio-haptic ones, for providing a non-visual track perception and mental map of the path.
- Provide updated data through a public Service Platform on the web. Information collected by Argus users will be shared with other ARGUS users or with general public.
- Develop a Personal User Software application for authorised third parties. With this software, stored pre-defined tracks can be transmitted to the user terminal on demand.

# Overall Work Plan



## Current work

- 6 first months of ARGUS **successfully** completed.
- **WP1 completed and closed** – Technical requirements and scenario definition:
  - User requirements defined: validation tests performed with users in collaboration with national associations of people with visual impairment (ONCE, FTS, RNIB, Hilfsgemeinschaft, etc.)
  - ARGUS architecture defined.
- First validation carried out: Selection and validation of headphones that meet the safety needs of the blind and partially sighted in outdoor navigation tasks. 2 headset categories tested:
  - Headphones non-disturbing the general hearing

1. Audiobone



2. Vibe BS NVE



- Normal headphones:

3. Elecom



4. Sennheiser



## Upcoming steps

- Recently started activities:
  - **WP2:** User Terminal design – HW
  - **WP3:** Application platform for service delivery – Back Office
  - **WP4:** Advanced options personalization
  - First **Proof of Concept** to be ready within the next 3 months: System feasibility and potential of use will be demonstrated.

Proof of concept and project outcomes: See you at the ARGUS website and soon in Youtube, Twitter and Facebook.

Subscribe to the ARGUS newsletter: <http://projectargus.eu/Newsletter.asp>



**Thanks for your attention**

**Questions?**