



Fraunhofer

Portugal

**Assistive Information and
Communication Solutions**

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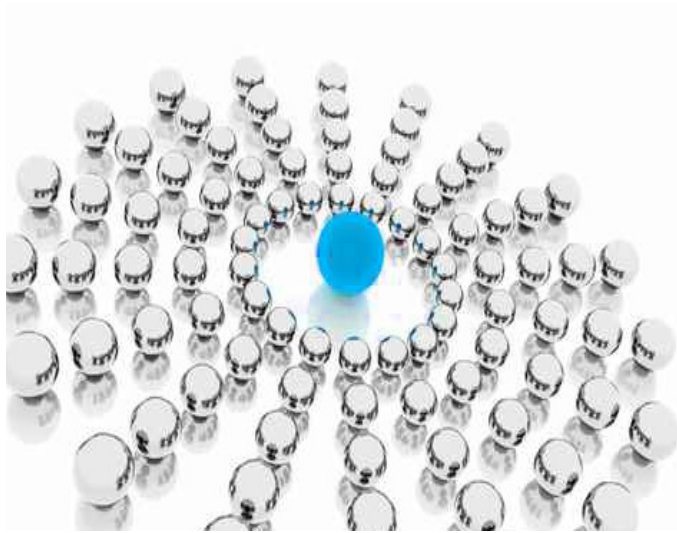
AICOS - Vision

Extending the Reach of the Information and Knowledge Society:

Bridging the Digital Divide through Barrier-Free IKS Access with Innovative ICT

In more practical terms:

We would like to provide applicable solutions with commercial value for assistive information and communication environments aimed at groups, that currently suffer from no or limited access to ICT.



AICOS - Targets

Activities of AICOS will generate new and increased demand within the addressed parts of the society to participate in the IKS

AICOS does have a wider focus than 'Ambient Assisted Living' (AAL), that currently targets mainly on elderly persons and health care aspects

Main academic target of AICOS activities is to boost people with lower qualification or income to become full and permanent members of the IKS

Main commercial target of AICOS is to support industrial partners with developments applicable to their existing and future products



AICOS - Addressed Target Groups

AICOS aims to provide assistive communication environments (ACE) for different geographical regions and specific segments of their population

■ Regions

- Europe, with special focus on the Iberian peninsula
- Africa, with special focus on Angola, Morocco, Mozambique and South Africa
- South America, with special focus on Brazil

■ Segments

- Aging and elderly
- Lesser qualified & interested
- Lesser funded
- Rural located
- Caring professionals and relatives (of the above mentioned groups)

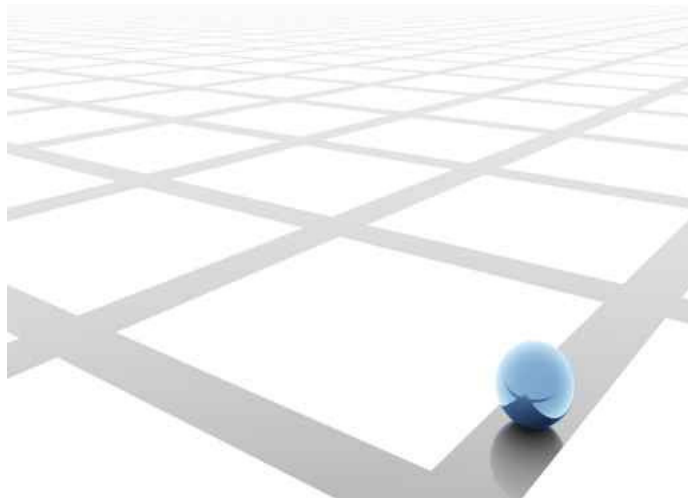
AICOS - Addressed Markets

Although 'Ambient Assisted Living' often is reduced to assistive healthcare solutions, assistive information and communication environments serve many markets

- Public Amenities/Buildings, Shopping Malls (digital signage, Childfinder, intelligent advertisement)
- Transportation like airports, train/bus stations, trains/busses, highways, fuel stations (digital signage, passenger navigation/guidance, intelligent tickets)
- Public broadband infotainment solutions (devices, applications remote management, operation, content for walled & cared gardens)
- Solutions for home environment including CPE, STB, future IP-multi-play-devices
- Healthcare support and infotainment for senior residences, homecare, hospitals and rural areas (info-points, rural internet café, IP-multi-play systems)

AICOS - Activities

Extending the reach of IKS by lowering technical and financial barriers:



- Development of assistive systems for the primary demands of the addressed target groups
- Provision of content adaptation services and development of new content formats
- Development of (public) end-systems, intuitive user-interfaces & front-end applications
- Development of access solutions for low cost broadband access (alternative technical solutions and business models)
- Development of front-end aligned back-end systems
- Transfer and commercialization of results
- Set-Up and/or backing of field-tests

AICOS - Fields of Activity

Content

AICOS primarily will not produce new content but will offer services to potential content providers to adapt their content to the specific demands of the addressed users. This includes consulting for the generation of new content and media formats for the future. Initially offered for free, the content adaptation might become a commercial service later.

Public & Personal End-Systems, User-Interfaces and Front-End Applications

One of the main obstacles, not only relevant to users with lower qualification, is the usability of services and applications. Target of this cluster is to provide robust and easy-to-use access to content. This includes design and implementation of integrated IP-Multi-Play Front-End Applications, specific for the targeted end-systems (public terminals, standard PCs and embedded systems). Intuitive graphical user-interfaces will help to address illiterate persons as well. A larger scale roll-out of public terminals might lead to significant external revenues as well



AICOS - Fields of Activity

Economic Broadband Access

Financial barriers are a main factor that opened the digital divide. Public-private DSL access over WLAN might help to provide broadband access in highly populated areas without increased CAPEX and OPEX on the carrier side. Other solutions might include rural versions of 'Internet Cafes', that can be operated remotely. Work within the cluster will develop and evaluate business models and technologies suitable to support the spread of the IKS through low cost broadband access

Aligned Back-End Systems

Certain types of content adaptation might require network-based on-line services for pre-processing (e.g. Web on TV or transcoding & transrating of user generated content) to reduce end-system costs by replacing the requirement of a home PC with the option to use a low-performance STB (Set-Top-Box). Remote management and maintenance of public and personal end systems based on back-end system solution will contribute to the availability of the systems in environments with limited possibilities for local access and thus is crucial for the commercialization as well.

AICOS - Working Together

AICOS requires experts from many fields working closely together:

- Software Developers & Computer Scientists
 - Networking Protocol Specialists
 - Electrical Engineers (Computer HW, Power Supplies, Transmission)
 - Designers (Usability, GUIs, Enclosures, Web/Application, Content)
 - Mechanical Engineers (Enclosures)
 - Economists (Business models, cases and plans)
 - Medical scientists and Pharmacologists (special focus on aging and elderly)
 - ...
- AICOS is dedicated to the applicability of the results for our customers. Doing so, helps our customers to implement their commercial success stories.
 - Most of the projects will require significant external funding, thus our customers will guide the direction of developments and research. We have to keep in mind, that they are the experts in their specific market and know well, which product they can sell. Our job is to propose, consult and implement ideas to their satisfaction.
 - To students AICOS will offer the a first-time opportunity to participate in customer projects and to practice their skills in a ,real-world' environment.

AICOS - Background

AICOS is a joint activity of the Fraunhofer Gesellschaft and the FCT

- AICOS started in May 2008 as a project center at the University of Porto
- During 2008 it will become a research center, owned and operated by Fraunhofer Portugal
- Starting with approximately 10 FTE in 2008, AICOS plans to grow to 40 FTE by 2013, that will lead to a head count of 40 researchers and more 40+ higher grade students.
- Cooperation with Fraunhofer Ambient Assisted Living (AAL) Alliance and with the Fraunhofer network.

Fraunhofer Alliance „Ambient Assisted Living“ – Member Institutes

Service platforms,
Development of services


Fraunhofer Institut
Software- und
Systemtechnik


Fraunhofer Institut
Arbeitswirtschaft und
Organisation

Usability, End User Studies,
human-robot interaction



Fraunhofer Institut
Mikroelektronische
Schaltungen und Systeme


Fraunhofer Allianz
Ambient Assisted Living


Fraunhofer Institut
Graphische
Datenverarbeitung

Hardware system integration,
Sensor and micro transponders

User Interfaces,
SW-Infrastructure


Fraunhofer Institut
Integrierte Schaltungen

Sensor nodes,
communication,
localization


Fraunhofer Institut
Experimentelles
Software Engineering

Systematic development of
software-intensive systems


Fraunhofer Portugal
Assistive Information and
Communication Solutions

Fraunhofer Portugal

AICOS-Location & University of Porto

AICOS - Location



U. PORTO

The University of Porto is the largest university in Portugal and one of the most prestigious teaching and research institutions in the country.



AICOS - Location

AICOS resides on the Campus of the University of Porto

- AICOS will be located first in the building of the computer science department
- In Q4/08 AICOS will move to the new UPTEC Building



ZV-P2/July 07

AICOS - Location



Three campuses in the city of Porto house 14 faculties, the business school and over 70 research units at the University of Porto.

- Faculty of Architecture
- Faculty of Fine Arts
- Faculty of Science
- Faculty of Nutrition and Food Sciences
- Faculty of Sport
- Faculty of Law
- Faculty of Economics
- Faculty of Engineering
- Faculty of Pharmacy
- Faculty of Arts
- Faculty of Medicine
- Faculty of Dental Medicine
- Faculty of Psychology and Education
- Abel Salazar Biomedical Sciences Institute
- Porto School of Management

AICOS - Location



- 72 Research Units
- 36 Research units graded 'Excellent' or 'Very Good'
- 8 Associate Laboratories
- 23 Research units in Engineering and Technology Sciences
- 14 Research units in Art and Humanities
- 11 Research units in Health Sciences
- 10 Research units in Social Sciences
- 7 Research units in Natural Sciences
- 7 Research units in Exact Sciences

AICOS - Location



Nearly 28,000 students attend the 14 faculties of the University of Porto, the Portuguese largest academy.

- 2 265 Teaching Staff (1860 ETI)
- 1 522 Teaching Staff with PhD
- 1 693 Non-Teaching Staff
- 27 690 Students
- 17 275 1st cycle students
- 8 061 2nd cycle students
- 1 612 PhD students
- 742 Post-Doc students
- 1 913 Foreign students (7% of total)
- 921 from mobility programmes
- 465 1st cycle students
- 259 2nd cycle students
- 177 PhD students
- 59 Post-Doc students
- 58 Nationalities

Fraunhofer Portugal

Backup

Backup

Examples for Assitive Communication Environments (ACEs)

- ▶ Following are some examples that try to transport the idea, what assistive communication environments can look like.
- ▶ As can be seen, ACEs are not growing in small gardens. They require the skills of many experts in varying teams.
- ▶ The highest goal for an ACE is the value and usability for the specific user group
- ▶ The following examples have not been investigated in depth and are meant for the illustration of the idea. There might be already similar projects around the world.

Backup

A potential activity for AICOS; Proposal for EU-Project POPPI

(applicable to hospitals, Senior Residences, or elderly Individuals)

▶ **Common Problem: Medical prescriptions and patient information leaflet (PIL)**

- ▶ Individual dosis, schedule and duration of medication
- ▶ Hard to read and understand PIL with difficult terms, small font sizes, b/w graphics, or even without PIL (fraction of tray)
- ▶ Adverse reactions with other medicaments

▶ **Assistive Solution: Personalized Online Prescription and Patient Information (POPPI)**

- ▶ MD fills out electronic prescription for patient (POPPI)
- ▶ Patient has electronic ID (e.g. RFID-Tag, Health-Insurance Card)
- ▶ Pharmacy/Nurse has access to POPPI and provides patient with medicaments
- ▶ Patient has access to public or personal terminal with ID-Reader
- ▶ POPPI Back-End generates individual PIL for all medicaments prescribed, based on database filled by pharmaceutical companies in standardized format
- ▶ POPPI-Terminal identifies patient by ID and POPPI Front-End gives illustrated, step-by-step instructions through target group specific GUI
- ▶ Personal Terminals might give additional scheduled alarms
- ▶ Feedback to MD/Nurse if POPPI terminal has not been used by patient, or patient reports complications

Backup

A potential activity for AICOS; Broadband Communication for Rural Regions

(applicable to rural regions in Europe, Africa and South America)

▶ **Common Problem: Limited availability of economic broadband access in rural and lesser funded regions**

- ▶ Technical problems due to inadequate distances for broadband access networks
- ▶ Difficulties due to missing personnel for management and maintenance of equipment
- ▶ Availability of reliable electric power
- ▶ Cost for personal end systems

▶ **Assistive Solution: Rural Internet Café (RICafe)**

- ▶ RICafes will be implemented in locations with central meaning to the local population (Bar, Café, fuel station, post office, bus stop)
- ▶ Internet access is implemented through fixed, mobile or satellite access networks
- ▶ A RICafe is a dedicated end system that supplies basic Internet applications (e.g. Browser, mail-client, VoIP-client, Messenger) inside a front-end application shell, that offers illustrated help for first-time and illiterate users
- ▶ Additional applications might include e.g. a POPPI-client, or a health-care video telephony client
- ▶ RICafes are vandalism proof systems with integrated UPS (or even a generator for electricity) that offer complete remote management capabilities through TR-069
- ▶ Users will receive an ID-Card/Tag for a personalized access to the RICafe applications
- ▶ Operators will be Telcos/ISPs, costs are carried by users and governmental institutions



Backup

A potential activity for AICOS; Low Cost Internet Access

(applicable to highly populated regions in cities)

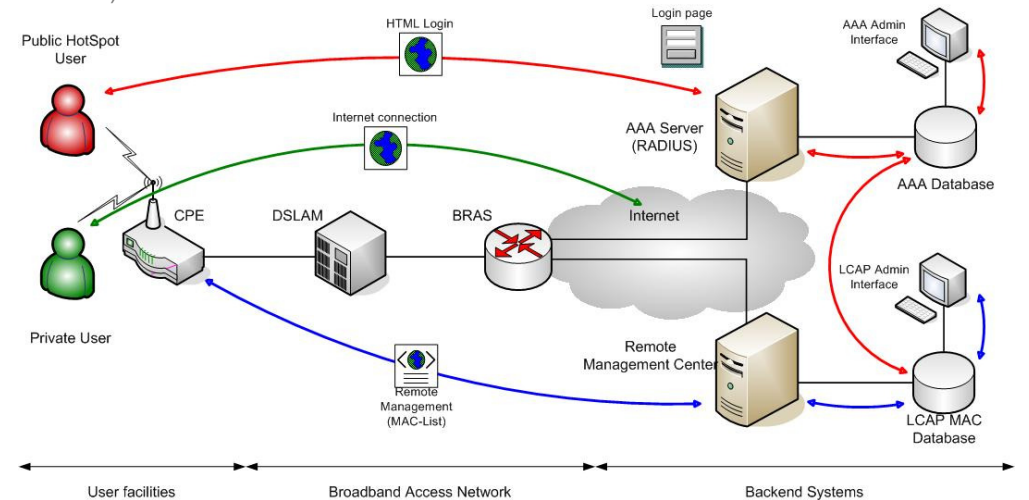
▶ Common Problem: Less funded users can not afford internet access at home

- ▶ Although well skilled and interested, less funded persons often can not afford an internet access at home
- ▶ Uncontrolled sharing of private WLAN-based Internet access can cause abuse (illegal down/uploads, fraud, DoS attacks...)

▶ Assistive Solution: Managed Public-Private Hot-Spot Systems

- ▶ Modified private CPE/IAD (DSL/Cable WLAN-Router)

allow managed and controlled access for public users (similar to FON, but optimized for the needs of a fixed network operator)



Backup

A potential activity for AICOS; Self-Synchronizing Content-Gateway

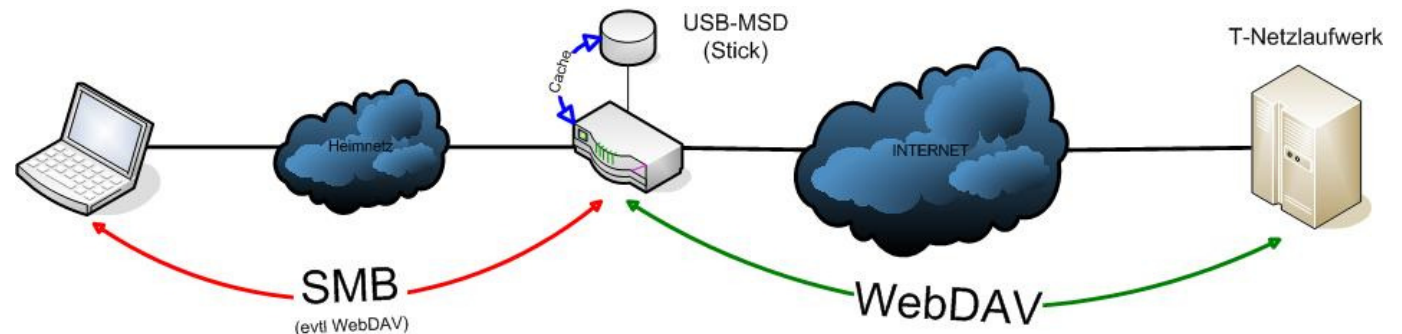
(applicable to heavily armored users ;-)

▶ Common Problem: User generates content with different devices, but expects ubiquitous access

- ▶ Transfer and synchronization of content between different devices is often based on proprietary tools
- ▶ Time consuming and error prone with an increasing amount of devices

▶ Assistive Solution: Self-Synchronizing NAS/GW-Devices

- ▶ Modified private CPE/IAD (DSL/Cable WLAN-Router) allow managed and controlled synchronization of content between home sphere, mobile devices and network integrated storage



Backup

A potential activity for AICOS; Systems for anti-geeks and DAUs

(applicable to those, that are not in love with PCs)

▶ **Common Problem: Interest in communication and information, but not time, interest or skills to set-up, maintain and configure a PC**

- ▶ Although interested in the Internet and its offers, many users simply refuse to work with computers as they are today.
- ▶ Viruses, worms, frequent updates and required configurations frequently annoy users
- ▶ Flexibility to install lots of SW often is leading to unpredictable results

▶ **Assistive Solution: Walled Garden devices with integrated IP-Multi-Play application**

- ▶ Operator managed end-systems with an integrated application for the majority of demands of the specific user group.



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Technologies needed for the Aml vision



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Technologies needed for the Aml vision



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Smart Materials, Sensors, intelligent clothes,
ubiquitous and pervasive



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Technologies needed for the Aml vision

Embedded devices,
context and situation

aware



Smart Materials, Sensors, intelligent clothes,
ubiquitous and pervasive





Technologies needed for the Aml vision

Embedded devices,
context and situation
aware



Devices with internal intelligence,
person and preference aware

Smart Materials, Sensors, intelligent clothes,
ubiquitous and pervasive





Fraunhofer Allianz Ambient Assisted Living

Technologies needed for the Aml vision

Integrated Interaction with devices, intuitive and simple

Embedded devices, context and situation aware



Devices with internal intelligence, person and preference aware

Smart Materials, Sensors, intelligent clothes, ubiquitous and pervasive



Fraunhofer Portugal Assistive Information and Communication Solutions

Technologies needed for the Aml vision

Integrated Interaction with devices, intuitive and simple

Embedded devices, context and situation aware



Fraunhofer Allianz Ambient Assisted Living Intelligent Middleware and Software Architectures, Dynamics and self-organization



Devices with internal intelligence, person and preference aware

Smart Materials, Sensors, intelligent clothes, ubiquitous and pervasive



Fraunhofer Portugal Assistive Information and Communication Solutions

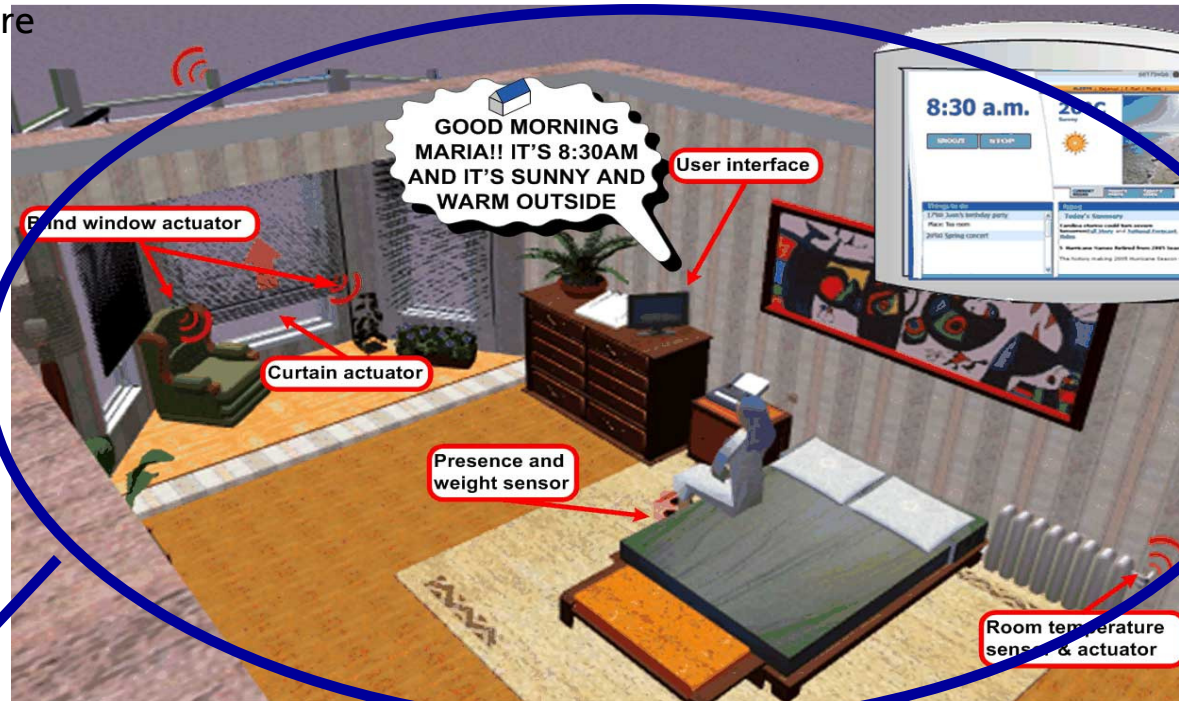


Technologies needed for the Aml vision

Integrated Interaction with devices, intuitive and simple

Fraunhofer Allianz Ambient Assisted Living Intelligent Middleware and Software Architectures, Dynamics and self-organization

Embedded devices, context and situation aware



Devices with internal intelligence, person and preference aware

New Experiences in assistive environments

Smart Materials, Sensors, intelligent clothes, ubiquitous and pervasive



Fraunhofer Portugal Assistive Information and Communication Solutions

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Designated Director

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- 2000-11/2007
CEO & Founder IVISTAR AG, Berlin
Please visit <http://www.ivistar.com>
- 1997-2000
Senior Scientist at GMD/FhG FOKUS, Head of 'HOT – Home and Office Technologies' department
- 1996
Dr.-Ing. from TU Berlin CS-Department (OKS, Prof. Popescu-Zeletin):
Efficient Integration of ATM-Technology in Multimedia Endsystms
- 1992-1996
Scientist at GMD FOKUS
- 1992
Dipl.-Ing. from TU Munich EE-Department (LKN, Prof. Eberspächer):
High-Speed FDDI-DAS (Dual Attachment Station) for PC/AT-Bus
- 1986-1992
Electrical Engineering / Communication Technologies at TU Munich
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