

Information Society Technologies (IST) Programme



Project Presentation

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Presenter

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List of Abbreviations

ADAS	ADVANCED DRIVER ASSISTANCE SYSTEM
AMI	AMBIENT INTELLIGENCE
BAN	BODY AREA NETWORK
CAN	CONTROLLER AREA NETWORK
E&D	ELDERLY AND DISABLED
EALM	ENHANCED ACCURACY LOCALISATION MODULE
ICT	INFORMATION COMMUNICATION TECHNOLOGY
IPDA	INTELLIGENT PERSONAL DAILY ASSISTANT
IT	INFORMATION TECHNOLOGY
IVICS	IN VEHICLE INFORMATION COMMUNICATION SYSTEM
MAS	MULTI AGENT SYSTEM
MI	MOBILITY IMPAIRED
PAN	PERSONAL AREA NETWORK
PDA	PERSONAL DAILY ASSISTANT
QoL	QUALITY OF LIFE
SME	SMALL AND MEDIUM ENTERPRISE
SP	SUB-PROJECT
S/W	SOFTWARE
UI	USER INTERFACE

1. Introduction

In general, the population of Europe is getting older due to lower fertility-rates and longer life expectancy (EUROSTAT 2001).

Mobility Impaired (MI) people have a wide variety of functional impairments, and it should be noted that only 2-3 percent of disabled people are in wheelchairs. However, any activity limitation that prohibits the free movement of a person means that the person has a mobility impairment. In the context of ASK-IT the following sub-divisions give some indication of the wide context of mobility impairments:

- □ blind/partially sighted people;
- □ deaf and people with hearing problems;
- □ people unable to walk, i.e., wheelchair users;
- □ people who have difficulty in walking and bending limbs;
- □ people who have medical problems affecting balance and stamina;
- □ people with cognitive impairments/ learning difficulties;
- □ people who are illiterate.

Just under 20 percent of people living in Europe are unable to read (TURTLE 1995). Approximately half of these could be considered as mobility impaired under circumstances where literacy is required to make use of transport facilities.

In a very competitive market focused on numbers and quick profits through "trend" marketing aimed at young, able users, there has been to date little consideration of a "design for all" philosophy to facilitate inclusion of a larger and even more quickly growing market, that of Europe's senior and special needs population. However, as the younger market becomes saturated and the need for better designed systems for all become more apparent, it is anticipated that industry will see a better business case for targeting E&D users.

The Information technology (IT) capabilities have seemingly infinite potential usefulness to

E&D users, given their relatively limited mobility and specific requirements for "assistive" services. Indeed the real need for such well designed IT is much more clear-cut than in other sectors of the EU's citizenship. This population needs and deserves "design for all" consideration to access easily both the internet and mobile-based services.

A number of EC-funded research initiatives relevant to ASK-IT objectives are taken into account, as IMAGE, IM@GINE IT, ADAMANT (developing intelligent agent-based services), SPORT4All, DISTINCT, CONFIDENT (developing specific services for E&D users), TELSCAN, INFOPOLIS (UI for travel information), etc. In the above projects and more, partners of ASK-IT have participated and are available to offer the necessary knowledge transfer.

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2. Aims

ASK-IT aims at developing an extended ambient intelligence space for the integration of functions and services for elderly and disabled people across various environments (car, bus, airplane, home, work, leisure and sport).

In its quest to support the user in a holistic manner, ASK-IT focuses on geo-referenced and personalised transport and tourism services. Emphasis is on *seamless service provision*, independent on the media, user location (i.e. indoors, outdoors, in a city, during a trip, etc.), user type and residual abilities. Thus, ASK-IT deals with the following **key objectives**:

- □ **Mediation of services and content:** there is not a static database; rather, the content (based on ontologies) is combined and

presented to the user in a one-stop-shop concept.

- **Seamless environment management:** Seamless provision of service and support across the route everywhere, anytime and by many mobile and/or fixed means (i.e. use of computers in all places by specialized software, on users mobile and able to be self-installed, interface to assistive devices, and local user communities, etc.).
- **User preference and context-related driven processes:** Offering intelligent support and automatic adaptation of service content and layout (user interface) to the user, by knowing his/her exact location, transportation plans, static profile (i.e. type of disability, age, gender, education level, etc.), dynamic preferences (i.e. hotel level, number of transportation mode changes accepted by the user, restaurant preferences, etc.) and context of use (i.e.

provide access to the services and tools by addressing the appropriate senses, through an automatic and dynamic interface of all different content types and providers by an Internet-based system, without the need to store statically information and with pan-European coverage.

- **Flexible geo-referenced services:** combining multimodal travel information provision with pedestrian navigation on accessible routes, both outdoors and indoors and according to the required level of accuracy by the user (i.e. higher accuracy required for blind people for obstacle avoidance) and the context of use (i.e. more precision required on the lane position while driving a car than being in the bus).
- **All within a user confidence based environment:** handling issues of safety, reliability, security, privacy and usability.

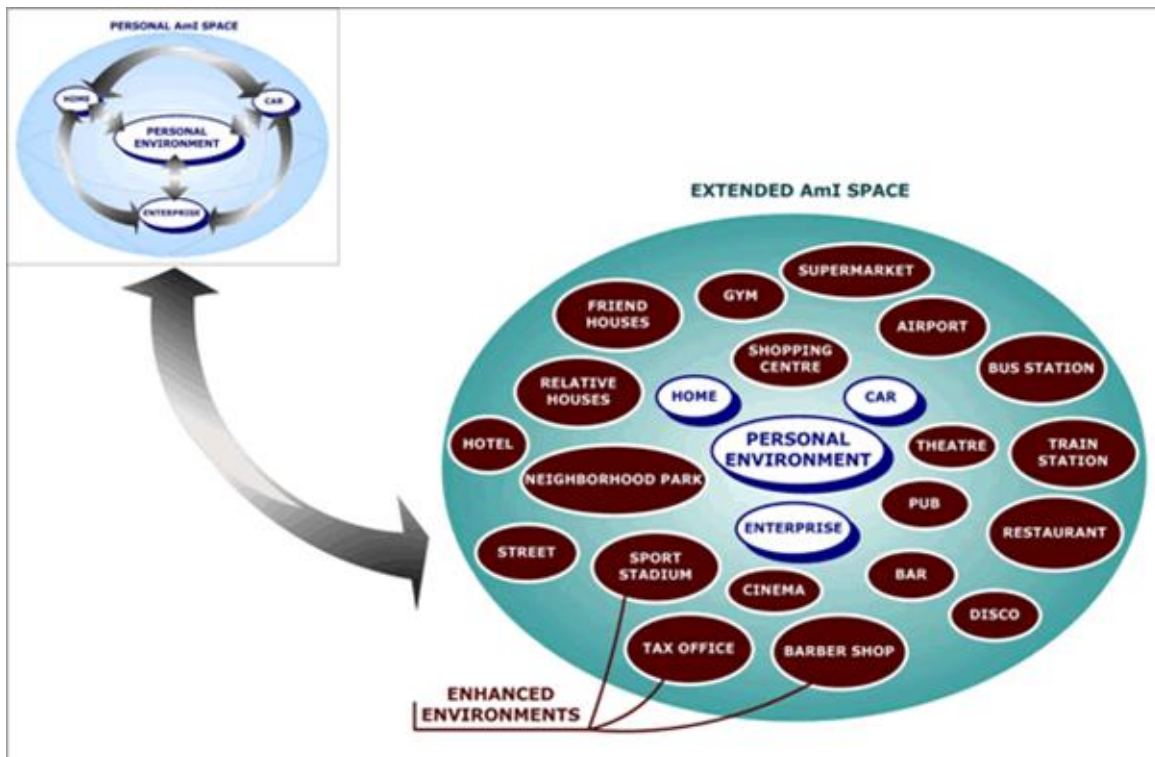


Figure 1: The application spaces of ASK-IT. Going from a limited controlled environment to an AmI space in each environment.

tourist, commuter, businessman, etc.). In terms of User Interface hardware, optimised and innovative devices for both stationary and mobile communication will

The above are shown in the following figure.

3. Short description of the Subprojects

3.1 SP1: Content for all

In this part of the work, information is collected on the required content for E&D travellers, based on user requirements and modelling of the content. The subproject forms the basis of the other subprojects. The starting point is the identification of user groups and the relevant priority use cases.

Surveys and participative observations are carried out to assess needs regarding infomobility and available market products. User requirements which result from this subproject will be translated into measurable constructs and qualitative and quantitative measurement methods and criteria, in order to produce the strong link between requirements and empirical assessment. The analysis of all existing content results in consensus on a common content format and ontologies and the development of a semantics based data management module, that allows ASK-IT to have access to all gathered content dynamically.

3.2 SP2: Tools for all

The work in this sub project focuses on the development of tools, applications and services that are being offered to the end user through the Multi Agent System (of SP3). The tools to be developed include an enhanced accuracy and seamless universal localisation system (improvement of the level of accuracy in navigation and in cases of emergency, seamless provision within transportation modes, buildings, in cities and rural areas, etc.), an integrated accessible route guidance system and appropriate interfaces to e-commerce, e-payment (to easily pay for the requested services), domotics (e.g. to plan a holiday trip as well as to support home environment control while travelling), vehicle control aids, health and social care systems (to secure medical support while travelling), assistive devices and e-Work, e-Learning and computer accessibility systems (to promote MI people to mobile

workers); all of them using intuitive, innovative and cross-platform compatible UI concepts, that combine haptic, audio and visual elements to the MI groups residual abilities and the various use cases and tasks.

3.3 SP3: Ambient intelligence framework

In this SP, an extended Ambient Intelligence Space (AmI) will be specified and developed for the integration of functions and services for MI users across several environments. Today, MI people can have full access within their restricted, well adapted personal environment (i.e. home, car, enterprise). The ASK-IT vision is to extend this personalised access to the generic environment while travelling, by making this ambient environment modular, adaptable and thus intelligent.

The main objective is to allow direct natural and intuitive dialogs with applications and services, providing knowledge and content organisation and processing. The enhanced AmI Space will personalise ASK-IT services, by taking users' preferences, habits, residual abilities and profiles into account in relation to actual situations, supporting MI people in an active way to achieve specific tasks, using a variety of interaction devices.

This entails the development of a Multi-Agent system for service monitoring and delivery, a self configuration module for the UI, the implementation of a semantics engine for knowledge mining and discovery, modules for local and wider area networking, service integration and security management.

3.4 SP4: Accessible Europe

The application of the integrated ASK-IT service to 7 sites Europe-wide will be realised within this SP, in order to be tested in a wide range of urban and inter-urban (cross-site) scenarios, aiming to prove its usability, reliability and viability and to propose system improvements, modes of use and extensions.

The final sites and application scenarios per site will be selected according to the available content and requirements from SP1, as well as to infrastructure availability for SP3 modules. Initial pre-selection includes North, Central, South and Eastern European cities.



Figure 2: Preliminary selection of ASK-IT application pilot sites.

Interconnected urban and inter-urban Pilots are planned to demonstrate ASK-IT feasibility, and interoperability and provide adequate feedback to the development team for system optimisation.

3.5 SP5: Horizontal activities

The general objective of this subproject is to correlate the different areas of research within the other 4 SPs, to provide them with a common research framework and cater for common activities such as dissemination, exploitation, management, interface to users' opinion and acceptance, legal and organisational aspects, system architecture, standardisation and policy issues. These activities are rather heterogeneous and have been gathered together for organisational rather than technical reasons and thus, each has its own specific objectives.

4. Content for all

The plans towards the content for all achievement are summarised below.

User needs and use cases

Following the user group definition, identification of MI users' problems (based on literature survey) and specification of content requirements will be performed. Existing measurement instruments will be surveyed, in order to select the correct instrument. Also, a common scientific glossary, to be applied in the project, along with a 'user friendly terminology' will be defined.

Content surveys

There are five types of services considered in the project: transportation services, touristic and leisure services, personal support services, work, business and education services and, finally, social relations and community building services. The approach of developing each content is as follows: first content identification and generation of relevant requirements takes place. This occurs through literature reviews, interviews and expert consultations as well as, analysis of existing websites in order to define a first set of requirements. Modelling will then take place, by generally accepted and used task analysis techniques.

The identification of the transportation content will begin by understanding the *transportation requirements* of MI people. The main methods of understanding these requirements will be through a review of legislation, standards and guidelines, both at national, European and international level, and a review of the literature. The transportation model can be filled in by content providers and will serve a wide variety of MI people, helping to improve levels of accessibility.

Regarding the touristic and leisure services, optimal information contents will be identified separately for different subgroups within the MI population. The work starts with an initial state of the art-analysis on existing mobile information services for touristic and leisure-oriented content, with emphasis on MI people-centred applications and standards. Existing guidelines and standards have to be considered in the very beginning of the content specification phase, in order to guide further work. Experts will evaluate existing applications as well as standards and recommendations, to identify technical limits and to propose ways to optimize existing services or to suggest alternative solutions. The expert knowledge will be synthesised to develop a model for the provision of touristic and leisure-oriented information to MI users.

Personal Support Services for MI are aimed for persons who are out-door or travelling or prepare a journey. These services may comprise, for example, specialized accompanying services, hiring of specialised equipment, support of daily living activities, medical care, therapeutical services, monitoring services for ill people, translation services for deaf people, and localisation/orientation support for confused people. The information needs of MI users, their family members and carers on Personal Support Services are analysed on the one hand, while existing information services on provided personal support services are analysed on the other hand, leading to the identification of possible gaps. Thus, the specification of a full content and information provision model on personal support services will be realised.

Within the framework of work, business and education support services, the identification of e-work and e-learning content for work and education services while on the move will be performed and the definition of a consistent model and quality of service requirements for MI users will be realised. Also, negotiation and finalisation of agreements with service providers and organisation of the content in a

comprehensive network will take place, to be integrated in the ASK-IT platform.

Content specifications will be also developed for ASK-IT Community Building Services, in order to increase accessibility of information, to decrease social exclusion and facilitate community building. The communities can collect and disseminate specific knowledge about medical information (medicaments, expectations, treatment procedures in the place of origin and of destination during a trip), related to finding the way in the field of care (how to organise care while travelling, contacting organisations of volunteers, etc.), mobility information (public transport, other transport, buildings, railway stations, the road, etc). Social isolation is averted by providing opportunities for chatting and internet conferences, communicating to specialists and to fellows who are in similar conditions.

Data management module

All gathered content will be interfaced to the Data Management Module. The role of the Data Management Module is to provide the means for efficient searching and retrieval of content that best matches the user needs and preferences. This content may exist in various formats (e.g. text, maps, multimedia, etc.), belong to different domains (navigation related data, e-business, e-health and general e-services related data, etc.) and be stored in various distributed locations. The Data Management Module exploits advanced knowledge management technologies in order to “understand” the requests of mobility impaired users and provide them with suitable information. In this effort, it takes into account the specific characteristics of different user-groups or individuals. Another role of the Data Management Module is to manage and ensure the final delivery of information that corresponds to the user request. In order to implement all these functionalities, it deploys a set of ontologies that describe the concepts involved to users’ activities and provide meaningful characterizations of the related content, according to the already developed content models, for each content type.

5. Tools for all

Within ASK-IT, service support tools will be developed, combining various technologies. The following summarised tools descriptions depict the relevant project plans.

Localisation and Navigation module for MI people

The localisation tool aims at the improvement of the localisation accuracy, which is the base for navigation, to make it appropriate for all target groups defined in SP1 for normal use and for emergencies. The localisation and navigation functions utilised in the ASK-IT demonstrators will use a number of different localisation technologies, depending on the environment and the available equipment, to guarantee seamless user localisation in all environments.

The level of accuracy will be defined by the user needs and application requirements. In general it is expected to reach an accuracy of one meter or even less. The integration of short range radio transmitters such as Wireless LAN and Bluetooth will be considered in order to gain a higher precision in localisation and navigation.

The result will be the so called Enhanced Accuracy Localisation Module (EALM), which is a software platform to combine different localisation methods depending on the users current needs, such as level of accuracy and guidance support (for example voice guidance).

Accessible intermodal route guidance module

The main aim is to provide guidance for mobility impaired people to support and assist them in their daily life (by finding their way). The task constitutes a comprehensive challenge, because of the necessity to integrate all existing guidance into one common navigation tool, which will take into

account specialised content and, in addition, to integrate it into the ASK-IT platform. The above enhanced localisation module will be used and also the special content gathered within SP1, and both will be integrated into a navigation module. The following figure shows the supported types of route guidance for MI people. These are the main navigation applications which will be prepared for access by MI users.

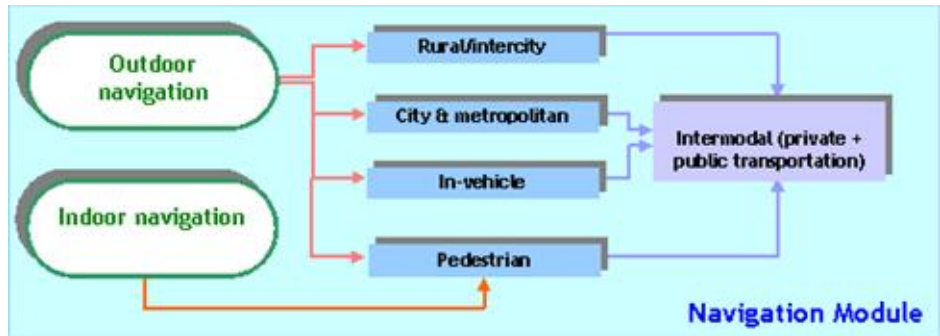


Figure 3: ASK-IT supported modes of route guidance and navigation for MI users.

Among others, this module will be connected to a trip planning model, to not only provide accessible route planning to MI users of all transportation means (i.e. pedestrians, drivers that need accessible parking lots, Public Transport users that require accessible terminals and vehicles), but also support 3D visualisation of the route and even “walkthrough” functionality for some of them, according to the following scheme.



Figure 4: Envisaged 3D visualisation of accessible routing module of ASK-IT.

According to the above tools descriptions, it can be easily concluded that they cover all areas of the everyday life of MI travellers. Innovation is twofold; making route guidance

of different types, i.e. in-car, pedestrian, etc., accessible by integrating relevant content, and then integration of all these types into a consistent and holistic multi-modal route guidance module.

E-Commerce and E-Payment module

A new model for payments from MI persons will be designed, taking into consideration and supporting their social funding schemes. A complete e-payment and clearing module will be defined and implemented, able to handle credit / debit or prepaid cards payments, providing multiple interfaces to all available mobile devices of the MI users (mobile phones, PDAs, PCs, etc.).

Domotic module

Domotic services are services that allow home environment control. Thus, a framework will be developed to provide seamless info-mobility services at home for pre-trip planning purposes. The goal is to integrate the MI user's origin into the overall travel chain, which will also lead to the integration of domotic functionalities into the ASK-IT service batch. In addition, it will allow to the MI user to tele-operate his/her home environment while travelling. Thus, the domotic module will provide infomobility services at home and remote home environment access (home automation devices and multimedia content) from abroad.

In-Vehicle assistance applications module

The goal of this application is to offer ASK-IT functionalities to MI users while driving, providing an interface with the device application which is delivered within the project. It will be possible to control ADAS and IVICS through ASK-IT UI and mobile units. MI people should be able to seamlessly use the vehicle and its telematic platform (CAN bus) as part of ASK-IT Ambient Intelligence space, guaranteeing also that the offered infomobility services to the MI driver will not endanger traffic safety and are in line with the EC eSafety initiative.

Health and emergency management module

Both static and dynamic medical data will be collected and stored within this module (coming from wearable sensors and medical devices), to offer health and emergency management services to ASK-IT users. Data from other modules (i.e. localisation, assistive devices) will also be collected, to guarantee swift service provision to the user. It will provide security to the MI users by supporting seamless medical care and emergencies handling while travelling. The connection between different situations, emergency services and subsequent actions will be established, so as to allow proper responses of the system in case of emergency or user request while on travel.

The users' medical and other personal data will be considered, to enable highly personalised services, which will help MI people during their mobile daily life. The system will mediate between the user and the local medical and social authority, making, if needed, cross-reference to the user's original record and/or expertise.

Computer accessibility, e-Working and e-Learning modules

In order to extend the scope of the ASK-IT platform to provide the mobile MI users with e-Learning and e-Working resources and tools, the interfaces will adopt and integrate the content into ASK-IT platform by appropriate support tools. The goal is to provide the targeted user group with the ability to work, learn and have access to local PC's while travelling, by self installation and uninstallation to the local PCs of their particular assistive s/w, so that they can also become mobile workers.

Application and device access interfaces for MI people

The specification and implementation of a generic assistive device application interface module is foreseen within ASK-IT, open for various interaction modes and applicable for various applications, while the user is on the move.

It is also intended to develop an overall interface concept for the MI users, covering all systems and services tailored to them within ASK-IT. UI's that are self explaining and easy to learn will be designed for each selected device and user group. The User Interface, actually, represents a large number of innovative interfaces for common stationary and mobile devices, such as mobile phone, PDA, www and stationary PC, addressing the needs of MI people.

6. Integrated services within intelligent framework

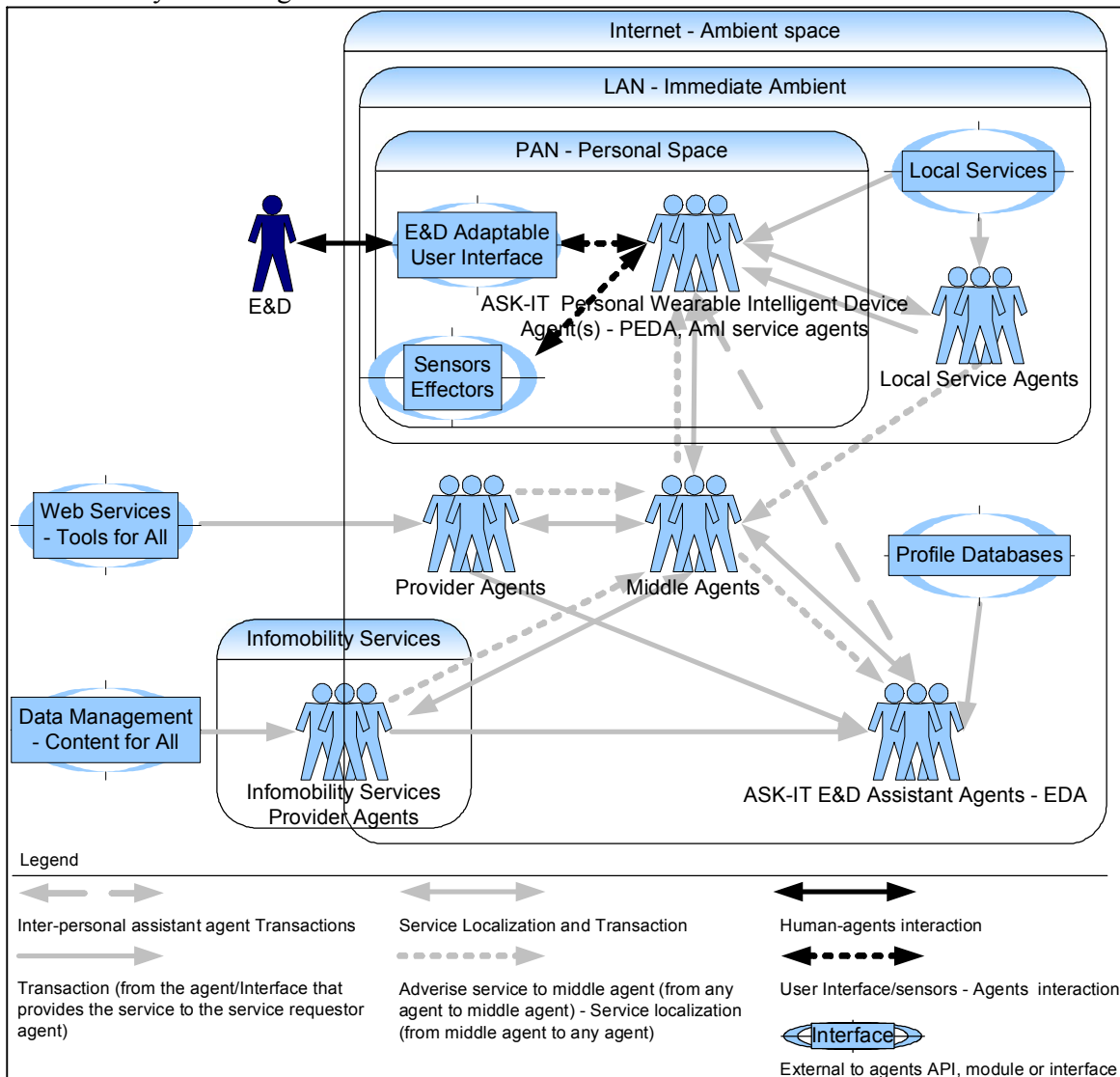
Ambient intelligence concept of ASK-IT

The ASK-IT service platform will be realised, that will integrate existing services as well as develop the new added value personalised infomobility services of ASK-IT. The Intelligent Multi-Agents System (MAS) is the core of the system's logic to allow users to

have access to internal and external services seamlessly and pervasively.

Figure 5: ASK-IT agents and their interaction.

A family of agents that will be capable of synthesizing and delivering these services to the end user through cooperation will be developed. Their cooperation will be ensured by adequate protocols that will coordinate their activities in order to timely produce any requested service. Moreover, the assistance of mobility impaired people will be strengthened by the development of a family of dedicated expert agent types, each of them can serve a user with a specific type of impairment and with any combination of impairments (exhibit emerging behaviour), through cooperation and dynamic team formation. Finally, the agents on the device will enable the ambient intelligence for their user by accessing and intelligently interacting with services and devices on the personal area network (PAN) and body area network (BAN).



Ambient Intelligence is used where intelligence is pervasive and unobtrusive in the surrounding environment. The AmI is the overall environment of which devices, applications, services and their interfaces may form part, as do the networks, sensor systems and other technologies that enable it. The main characteristics of the relation between an AmI enabled environment and the people using it are:

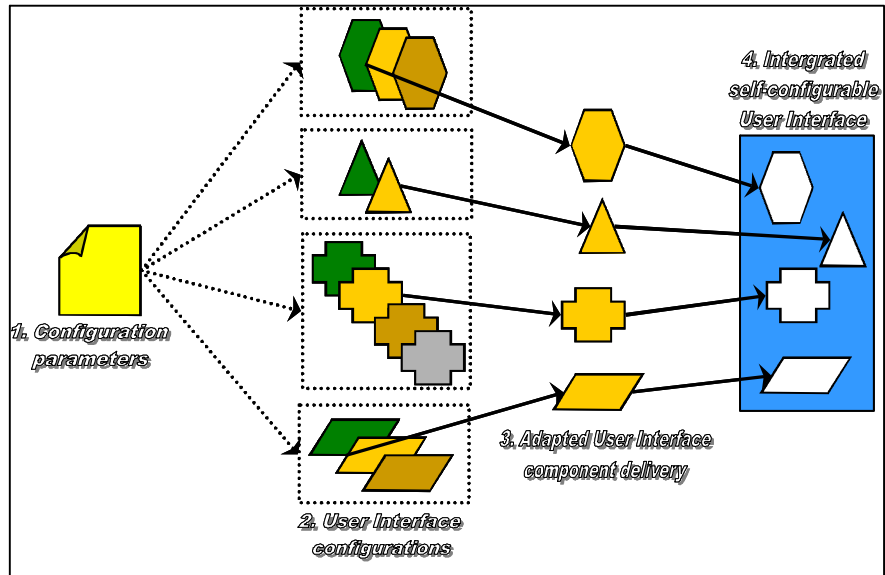
- **Non-obtrusive:** many often invisible distributed devices exist embedded in the environment, not intruding upon the person's consciousness.
- **Personalised:** its behaviour can be tailored towards personal needs and can recognise the user.
- **Adaptive:** its behaviour can change in response to a person's actions and environment.
- **Anticipatory:** it anticipates a person's need and environment as far as possible without conscious meditation.

Self-configurable UIs

The architectural and implementation ground for putting together the various User Interface components will be established, in a way supporting user-oriented delivery. Effectively, the overall technical target is to appropriately accommodate the required User Interface personalisation capability as follows:

- To provide multimodal user interfaces suited to the target: user categories, computing platforms, and selected applications / services;
- To support alternative configurations according to user abilities, habits and target contexts of use;
- To enable the automatic user interface selection given a particular end-user;

Figure 6: Self-configurable UI architecture of ASK-IT.



- To facilitate user interface configuration and customization by the end-users themselves.

Mobile devices application

The mobile application infrastructure for ASK-IT client software will be built and demonstrated, to enable mobility impaired individuals to interact with useful services through mass market mobile computing hardware. Fundamentally, the goal is to make it easy to build advanced mobile device software that meets ASK-IT requirements and also creates the opportunity for mass-developer participation in building such applications.



Figure 7: Future mobile phones of ASK-IT manufacturers to be used as potential intelligent platforms.

The focus will specifically be to extend (not replace) mass-market mobile device application programming models. To do this, both popular programming models and

popular mobile computing hardware will be utilized.

Intuitive semantics development

Semantics represent a particularly important amount of metadata that is crucial for providing a common understanding of the information, which is exchanged between users and all the modules of the ASK-IT system. Application areas include disability related personalised services, remote access services, business processes, messages, operations, document content and product data. The main objective is the development of the required semantics to express the information in a precise, machine-interpretable form, so that intelligent agents processing the same set of data share an understanding of what the terms describing the data mean. The idea behind is that the information is no more plain and static but dynamically linked and real-time interactive in order to reflect, in the best possible way, the real-life context, were the users have to finally perform any action.

Intuitive semantics will be one of the main means to support personalised and disability adapted access to the ASK-IT services, intelligent search and retrieval mechanisms, adaptation of content and services to the users' needs and integration of heterogeneous content and applications into the global ASK-IT platform.

Implementation of the ASK-IT platform

The integration of the modules developed in SP1, SP2 and SP3 will take place, within a trustable and secure web platform. User-related data will be protected (profile, habits, medical data, location), as well as the stored /interfaced content, the telecommunications integrity and reliability.

7. For an accessible Europe

The integrated ASK-IT system and services will be tested in 7 interconnected sites Europe wide, to prove that full travel accessibility for

MI users can be achieved in a reliable, seamless and viable way using a range of available technologies and communications networks, to provide early feedback on bugs and inconsistencies and guarantee smooth operation of the final ASK-IT system.

Once the sites have been conclusively chosen, local stakeholder groups will be formulated, local accessible content will be collected and interfaced to the data management module (described previously) and detailed application scenarios will be derived per site.

Site installation and preparation

Each site will be prepared for the installation of the integrated ASK-IT services. In each site, the appropriate infrastructure developed earlier on in the project (in SP1, SP2, SP3) will be implemented. Any missing content required for the proper realisation of ASK-IT services will be developed after month 18 of the project.

In addition, training will be provided to those responsible for operating the ASK-IT system, as well as to the local users of the system.

Pilot testing

The ASK-IT device will be trialled in the sites over a period of 25 months, involving around 100 Mobility Impaired Users in each of the main sites, being able to carry out trials based on several real life use scenarios. It is envisaged that 5-10 users will travel between the sites.

The results of these pilot tests will be evaluated and the device will be assessed as to its usability, efficiency, effectiveness and usefulness. This evaluation aims to ensure that the final product will be the best product possible and one that is accepted by the users.



Figure 8: Two possible ASK-IT application sites: Germany (left) and Hungary (right).

Firstly, Mobility Impaired Users will assess the quality, suitability and usefulness of the content, as well as its ease of comprehension. Secondly, the ASK-IT technical devices will be examined and evaluated, mainly in terms of easiness, usability, learnability and accessibility. User interfaces will be examined against intuitiveness, effectiveness, accessibility and friendliness in different forms (auditory, tactile, visual, etc.) and alternative delivery platforms (internet, mobile, etc.) will be assessed, ensuring usability of the diverse final products. As to the overall ASK-IT system evaluation, the usability experts of the consortium will provide guidelines for the industrial partners on how to best develop and implement the device to achieve optimal results. The ASK-IT devices will also be tested in an inter-urban and cross-country context, making use of multimodal transport chains.

Stakeholders' User Forum

The project attaches a lot of importance to involving the user community in the design, testing and implementation of the ASK-IT services. A Stakeholders' User Forum will be established, composed of both members from local user groups related to the ASK-IT test sites, and more generic stakeholders, in order to form a community of MI people, to check whether ASK-IT services fall "**within a user confidence based environment**". The User Forum will be constantly expanding towards interested third parties. It will serve as a dynamic pool of resources for the project. Bringing all key actors together, starting from the local site communities and moving to a Pan-European scale, will diffuse the ASK-IT concept and create consensus and third party involvement, which is a prerequisite for the project's success and viability. It will allow multiplying the project results and its effects through a wide adoption by the relevant scientific and users communities.

8. Expected Achievements

What ASK-IT is ultimately all about is developing real solutions and systems such as the following:

- □ open and modular service platform, offering a transparent central point from which to coordinate incoming end user data (user request) and outgoing service provider data (provider response);
- □ advanced key services, including their specific MI people related content and interfaces; e.g. navigation, localisation, route guidance, e-commerce, e-payment, personal assistance, e-learning, e-working, social relations and community building services;
- □ the necessary e-content for such services, and building the business models, ontologies and web semantics for their seamless and integrated delivery in an "one stop shop" service;
- □ an iPDA, based on intelligent mobile phones and PDAs, able to configure itself according to the specific needs of the person;
- □ the appropriate gateway of this device to key assistive technologies (such as domotics, emergency management, driver support aids, computer accessibility, etc.) and web services;
- □ a Multi Agent System (MAS), to self-adapt the service profile (content and user interface) to the implicit and explicit needs and wants of MI users, as well as the context of use;
- □ appropriate and innovative UI, that combine haptic interfaces, audio and visual elements to the MI groups residual abilities;
- □ new business modes and rules (i.e. "Clearing" entity) for the provision of the new services to MI users.

9. Expected Impacts

The project's aim is to improve the quality and efficiency of infomobility services for MI users. Thus, there will be major changes in the way in which society operates, and individuals organise their time and social activities.

ASK-IT will enhance the socio-economic integration of mobility impaired people, through:

Information Use: ASK-IT information will not only be used to plan a journey but also to organise leisure, educational, economic and social activities during its life. Information will be available to individuals at home as well as while on the move. The use of this information would lead to greater socio-economic integration and consequently there would be less reliance on social handouts.

Information Availability: Consortium members who are service providers, would provide ASK-IT the required information. Subsequently, this service could begin to pay for itself by providing additional services to other service providers and commercial companies that need to advertise their products or services. By becoming a self-sustained provider of content based information, ASK-IT would ensure continuity and the possibility of expanding trans-European networks.

Consumer Interaction with Information Networks: Mobility impaired people face the problem of interaction with ASK-IT technology and information services interface. Most of the technologies required have already been developed for people with sensory and physical impairments. By extending access to people with learning or cognitive deficits it would ensure even greater access to information and transport systems, with the consequent benefits of socio-economic integration.

Organisation of People in the Information Age: Information technologies are developing faster than existing European social structures. In market based economies it is impossible to arrest technological advance, as it gives competitive advantage. ASK-IT focus on end users is therefore completely justified.

As a practical outcome, ASK-IT would help Mobility Impaired individuals and their representatives to facilitate new and novel methods of economic and social integration.

Further, it would enable all sections of the community to increase their competitive ability and enhance the exercise of civil rights.

10. ASK-IT Consortium

ASK-IT Consortium consists of more than 50 partners from 15 countries in Europe, coming from the following research areas: Industry (mobile phones developers, middleware providers, transportation means manufacturers, assistive devices developers, etc.), Research Institutes (on transport, psychology, etc.), Universities, Software companies, Telecommunications companies, Elderly and Disabled Organisations, etc.

11. Further Details

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11.4 ASK-IT Project web site

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12. References

This presentation is based on the public deliverable D5.3.1 “ASK-IT Project Presentation” that was prepared at the beginning of the project

Annex A: Short Project Presentation

1. Introduction

Mobility Impaired (MI) people have a wide variety of functional impairments, and it should be noted that only 2-3 percent of disabled people are in wheelchairs. However, any activity limitation that prohibits the free movement of a person means that the person has a mobility impairment. In the context of ASK-IT, the definition of mobility impaired people requires a wide variety of persons to be considered, such as blind/partially sighted people, deaf and people with hearing problems, people unable to walk, i.e., wheelchair users, people who have difficulty in walking and bending limbs, people who have medical problems affecting balance and stamina, people with cognitive impairments/ learning difficulties, people who are illiterate.

To date, little consideration has been given of a "design for all" philosophy to facilitate inclusion in infomobility services of a larger and even more quickly growing market, that of Europe's senior and special needs population. The Information technology (IT) capabilities have seemingly infinite potential usefulness to MI users, given their relatively limited mobility and specific requirements for "assistive" services. Indeed the real need for such well designed IT is much more clear-cut than in other sectors of the EU's citizenship.

2. Aims

ASK-IT aims at developing an extended ambient intelligence space for the integration of functions and services for mobility impaired people across various environments (car, bus, airplane, home, work, leisure and sport).

ASK-IT focuses on geo-referenced and personalised transport and tourism services. Emphasis is on *seamless service provision*, independent on the media, user location (i.e. indoors, outdoors, in a city, during a trip, etc.), user type and residual abilities. Thus, ASK-IT deals with the following **key objectives**:

- **Mediation of services and content:** in a pervasive, translucent, understandable and managed way, supporting seamless and efficient supply.
- **Seamless environment management:** Seamless provision of service and support across the route everywhere, anytime and by many mobile and/or fixed means (i.e. use of computers in all places, of users mobile and able to be self-installed, interface to assistive devices, etc.).
- **User preference and context-related driven processes:** Offering intelligent support and automatic adaptation of service content and layout (user interface) to the users by knowing his/her exact location, transportation plans, static profile (i.e. type of disability, age, gender, etc.), dynamic preferences (i.e. transportation mode, hotel, restaurant preferences, etc.) and context of use (i.e. tourist, commuter, businessman, etc.).
- **Flexible geo-referenced services:** combining multimodal travel information provision with pedestrian navigation on accessible routes, both outdoors and indoors and according to the required level of accuracy by the user (i.e. higher accuracy required for blind people for obstacle avoidance) and the context of use (i.e. more precision required on the lane position while driving a car than being in the bus).
- **All within a user confidence based environment:** handling issues of safety, reliability, security, privacy and usability.



Figure 9: Future mobile phones of ASK-IT manufacturers to be used as potential intelligent platforms.

3. Short description of the Subprojects

SP1: Content for all

In this part of the work, information is collected on the required content, based on user requirements and modelling of the content. This subproject forms the basis of the other subprojects. The starting point is the identification of user groups and the relevant priority use cases.

Surveys and participative observations are carried out to assess needs regarding infomobility and available market products. User requirements which result from this subproject will be translated into measurable constructs and qualitative and quantitative measurement methods and criteria, in order to produce the strong link between requirements and empirical assessment. The analysis of all existing content, results in consensus on a common content format and ontologies and the development of a semantics based data management module, that allows ASK-IT to have access to all gathered content dynamically.

SP2: Tools for all

The work in this sub project focuses on the development of tools, applications and services that are being offered to the end user through the Multi Agent System (of SP3). The tools to be developed include an enhanced accuracy universal localisation system (improvement of the level of accuracy in navigation and in cases of emergency, seamless provision within transportation modes, buildings, in cities and rural areas, etc.), an integrated accessible route guidance system and appropriate interfaces to e-commerce, e-payment, domotics, vehicle control aids, health and social care systems, assistive devices and e-Work, e-Learning and computer accessibility systems (to promote MI people to mobile workers); all of them using intuitive, innovative and cross platform-compatible UI concepts, that combine haptic, audio and visual elements to the MI groups residual abilities.

SP3: Ambient intelligence framework

In this SP, an extended Ambient Intelligence Space (AmI) will be specified and developed for the integration of functions and services for MI users across several environments. The main objective is to allow direct natural and intuitive dialogs with applications and services, providing knowledge and content organisation and processing. The enhanced AmI Space will personalise ASK-IT services, by taking users' preferences, habits, residual abilities and profiles into account in relation to actual situations, supporting MI people in an active way to achieve specific tasks using a variety of interaction devices.

This entails the development of a Multi-Agent system for service monitoring and delivery, a self configuration module for the UI, the implementation of a semantics engine for knowledge mining and discovery, modules for local and wider area networking, service integration and security management.

SP4: Accessible Europe

The application of the integrated ASK-IT service to 7 sites Europewide will be realised within this SP, in order to be tested in a wide range of urban and inter-urban (cross-site) scenarios (to demonstrate ASK-IT feasibility, and interoperability), aiming to prove its usability, reliability and viability and to propose system improvements, modes of use and extensions.

The final sites and application scenarios per site will be selected according to the available content and requirements from SP1, as well as to infrastructure availability for SP3 modules. Initial pre-selection includes North, Central, South and Eastern European sites.



Figure 10: Preliminary ASK-IT application pilot sites.

SP5: Horizontal activities

The general objective of this subproject is to correlate the different areas of research within the other 4 SPs, to provide them with a common research framework and cater for common activities such as dissemination, exploitation, management, interface to users' opinion and acceptance, legal and organisational aspects, system architecture, standardisation and policy issues.