ASK-IT (511298) Integrated Project
Ambient Intelligence System of Agents for Knowledge-based and Integrated Services for Mobility Impaired users

clustered with the MAPPED project

Setting the Scene
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 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.

Approach
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.).
Project partners (continued):
- INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS – Greece;
- INSTITUTO DE APLICACIONES DE LAS TECNOLOGIAS DE LA INFORMACION Y DE LAS COMUNICACIONES AVANZADAS – ITACA – Spain;
- FOUNDATION FOR RESEARCH AND TECHNOLOGY-HELLAS – Greece;
- SIGMA CONSULTANTS – France;
- UNIVERSITAET STUTTGART – Germany;
- FORSCHUNGSGESELLSCHAFT FUER ARBEITSPHYSIOLOGIE UND ARBEITSSCHUTZ E.V. – Germany;
- EVANGELISCHE STIFTUNG VOLMARSTEIN – Germany;
- GROUPE DES ECOLES DES TELECOMMUNICATIONS – France;
- ROYAL NATIONAL INSTITUTE OF THE BLIND – UK;
- INFORMATION SOCIETY OPEN TO IMPAIRMENTS-ISOTIS – Greece;
- COMARCH S.A. – Poland;
- HACON INGENIEURGESELLSCHAFT MBH – Germany;
- DELTA SINGULAR S.A. – Greece;
- NETWORK MODELS R&D LTD – UK;
- EUROPAEISCHES MICROSOFT INNOVATIONS CENTER GMBH – Germany;
- TECHNICAL RESEARCH CENTRE OF FINLAND – Finland;
- FOURTH GL PRODATA LTD – Cyprus;
- TELESPAZIO S.P.A – Italy;
- PAN-HELLENIC UNION OF THE DEAF – Greece;
- ALCATEL SEL AG – Germany;
- SOLINET GMBH TELECOMMUNICATIONS – Germany;
- UNIVERSIDADE TECNICA DE LISBOA – Portugal;
- DOMOLOGIC Home Automation GmbH – Germany;
- NETSMART S.A. – Greece

- 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.

Short description of the sub-projects

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.

**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.
Expected Achievements and Impact

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

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.