

Towards an Accessible Europe

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Abstract. Mobility is a right that we all have. However, being able to travel by yourself, without the need of another person's assistance, is not always the case with mobility-impaired (MI) users. The reason for this is the non-accessible environment, which prevents an MI person from moving around, using and changing transportation means, having access to the proper information (on timetables, routes, etc.). Nevertheless, there exist certain accessible points and transportation means available in most European countries, but the people mostly in need of them do not have the proper information about it. ASK-IT IP aims to eliminate these barriers, by offering information about accessible content (transportation means, points of interest, etc.), following a 'design for all' concept and taking advantage of both location-based and infomobility services.

Keywords: accessibility, infomobility, disability, pilot sites, mobility-impaired.

1 Introduction

The population in Europe with problems using information and communication technology is estimated to be 22.25% (with different types of problems) [1]. Today, although ICT services are exponentially expanding in the area of transportation, there are many barriers for elderly and disabled people. For example, inter-modal and personalised accessibility information (content) along each route, for the above functionality to operate (referring to accessibility of pavement, transportation means, bus stops or parking lots, point of origin and destination), does not exist. Also, route guidance systems, which are useful for all, but are mostly needed by travellers with disabilities, lack an 'accessible route' functionality.

During the last years, significant attention has been given to the rights and opportunities of disabled people in most European cities. Most of the latest developments follow the accessibility instructions (e.g. accessible building entrances,

pavement, special transportation vehicles, etc.) and the services for the disabled persons are increasing continuously. To be in line with the technological trend of our days, and to really support the free mobility of those users, all these content and services have to be interconnected and offered as a global accessible service, that the user will be able to access at any time and from any place. The population needs and deserves a 'design for all' solution to access easily both the internet and mobile services, in order to be informed about accessible transport and accommodation, events and sites of interest, receive advice on getting there and, generally, about important issues of their travel. The travellers need reliable services that are available on call throughout a journey or service request. The most affected user groups are those people that suffer from limitations in moving freely, varying between functional limitations and activity limitations.

1.1 What ASK-IT Does

ASK-IT Integrated project, which is co-funded by the European Commission, has promised to support and promote the mobility of MI people, enabling the provision of applications and services and facilitating knowledge and content organisation and processing. MI people related infomobility content is collected, interfaced and managed, encompassing many areas, such as personal services, e-work and e-learning, social services, transport, tourism and leisure. The main benefit of ASK-IT services for the MI users is their accessibility in terms of content and HCI. In summary, ASK-IT offers its citizens (MI or not) rich, reliable, localised, personalised and dynamic (without having to maintain local web site, info is always fresh and just in time) services on localisation (where am I), guidance (how to go there), leisure (nearest preferred restaurant), work (ability to have business data access from any public or allied PC), social relations (networking with groups I belong to), etc.

The target groups of ASK-IT are people with a wide variety of functional impairments, such as people unable to walk (i.e. wheelchair users), with hearing problems, learning difficulties, visually-impaired persons, elderly and illiterate, as under circumstances literacy is required to find your way in the transportation network.

The integrated ASK-IT system and services are to be tested in 8 interconnected sites Europewide, to prove that the MI travelers can have full travel accessibility information, which will affect their daily transportation. The selected core ASK-IT sites are: Athens/Thessaloniki, Bucharest, Genova, Helsinki, Madrid, Newcastle and Nuremberg, while there is one more satellite site (i.e. covering only a few services and 1 user group category), The Hague.

2 Site-Specific Services and Their HCI

The above-mentioned pilot sites were selected with an open procedure, allowing all interested cities to take part. The final selection was performed, based on

a commonly applied scoring scheme, according to the feedback provided by the sites themselves, in terms of already available content, infrastructure, local support, etc.

ASK-IT does not start from scratch to develop services and gather accessibility content in its eight pilot sites. The pilot sites have already certain transport-related web services available for people with various types of disabilities, as well as relevant content for various points in the city and transportation means, that has been gathered in the framework of other, mostly national, initiatives. Unfortunately, in most cases, this info remains unused or underused, due to the low users' awareness about them, the missing sustainability strategies, or the lack of appropriate platforms to support these services. These services are being connected to the ASK-IT platform, following the ASK-IT ontology, while the available content is extended (by gathering new data) and transformed in web applications. Indicative examples of existing PC-based applications for disabled users, in the ASK-IT pilot sites, follow below.

One of the services that is being adapted and connected to ASK-IT is the route guidance functionality within the airports of Frankfurt and Athens. With this service, the traveler is able to view in his/her mobile phone or PDA, his/her position and destination within the airport in order to reach the assigned gate. A clear indication of the route to follow is also shown.



Fig. 1. Route guidance application in the airport of Frankfurt, given on a PDA

An available web service in Nuremberg is that with info about public transportation, timetables, maps. There is a specific section 'Mobility for All', through which the users can find accurate info about accessible elevators and toilet facilities in subway stations, accessible vehicles, low-floor-trams and low-floor-busses. Finally, touristic information is available about sightseeing and appropriate transportation.

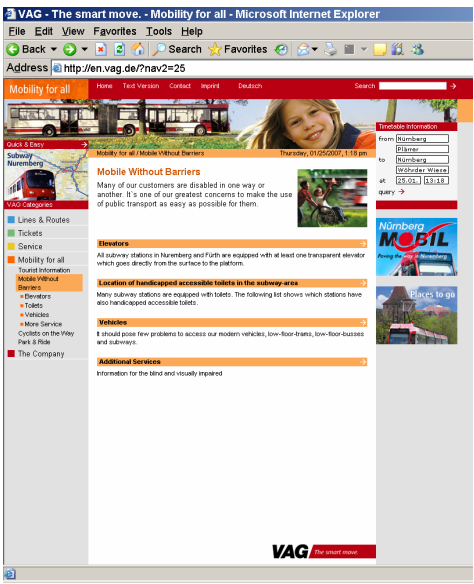


Fig. 2. On-line public transportation service for the city of Nuremberg

A database with information about accessibility points in the city of Genova (60km of pedestrian routes of the main tourist points in the city) presents to the user the detailed accessibility level of the route that has to follow to reach a specific place.

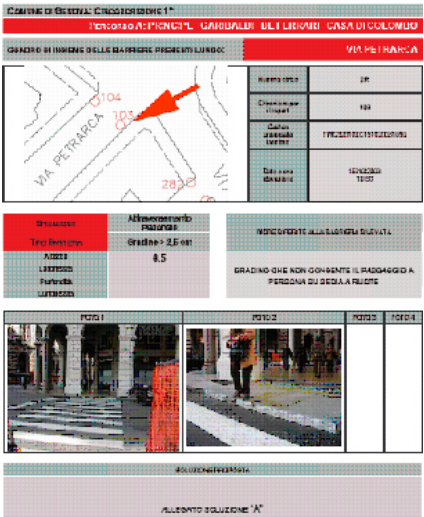


Fig. 3. PC application with accessibility info of points in the city of Genova

A similar PC application for the city of Athens is presented below, which is available in the form of a database with built-in, easy-to-use user interface. It presents

the accessibility level of certain points of interest (POIs) and, more specifically, of public buildings and buildings of residents affairs and of the connected transportation means to reach them, from 10 municipalities (priority to those near disability organisations) in Athens. In total, 124 buildings (banks, schools, medical clinics, ministries, post offices, city halls, etc.) were examined for their accessibility level, which are to be connected and enhanced within ASK-IT [2]. After the assessment, the buildings were assigned different colours, according to their level of accessibility (green: fully accessible; yellow: semi-accessible, i.e. in most cases there was possible to get in with a wheelchair but the interior might have some problems, such as small steps or narrow corridors and there is no accessible toilet in; red: non-accessible, i.e. the wheelchair could not pass from the entrance). Screenshots of the application follow below.

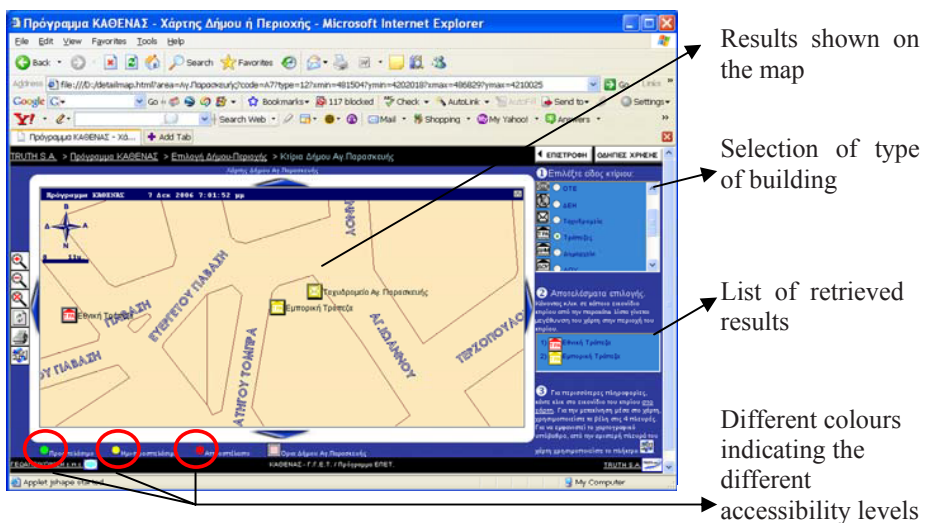


Fig. 4. PC-application, presenting the accessibility status of buildings in Athens and the connected transportation means to reach them

As shown in the picture above, different symbols are used to represent types of building. By clicking on a POI on the map, more detailed information is available. A short description of the accessibility barriers is included (in case of semi- or non-accessible buildings). The detailed transportation means that pass near this POI are indicated, as well as the distance of their stations from it. Finally, pictures of the exterior and interior space are provided. In this way, the disabled user is fully informed about each building, before visiting it, and can avoid unpleasant and unexpected situations, when he/she is already there. It has to be noted that all the examined buildings were visited by a wheelchair user during the assessment, for more profound results. Examples of UIs presenting the detailed information follow in Fig. 4 below.

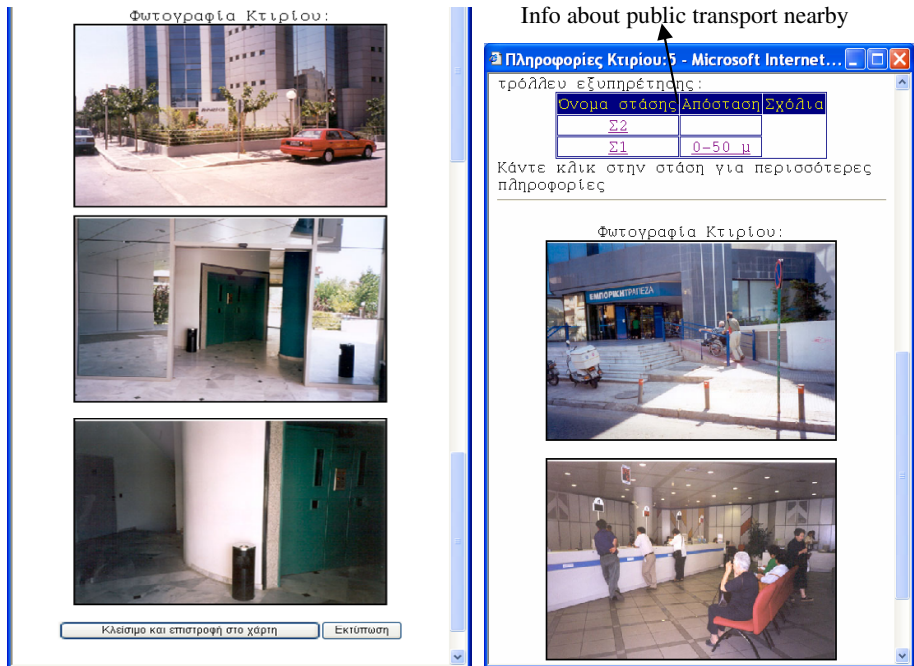


Fig. 5. Screenshots of detailed information of two different buildings in Athens

In Finland, there is an on-line service, through which the visitors can organize their vacations by selecting facilities (accommodation, activities planning, sights visiting, etc.) that satisfy their accessibility requirements.

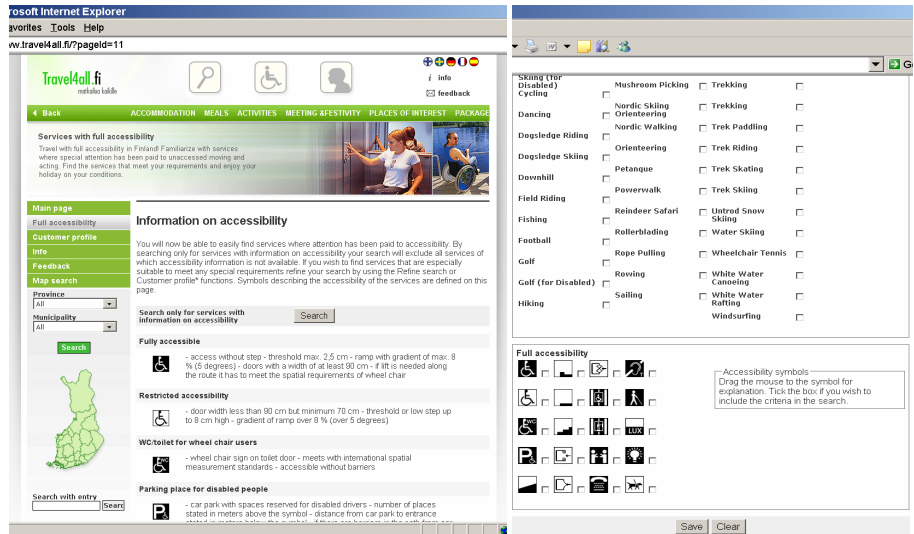


Fig. 6. Screenshots of the Finnish on-line service for accessible travel planning

Each user can build his/her profile by selecting the preferred type of activities; among the profile parameters, there are several accessibility parameters that the user can select. The visitors have also the possibility to see the location of the travel service on the map and make an on-line booking and e-payment of the selected facility.

In Newcastle, technical know-how for indoors navigation is available, using trilateration techniques, allowing the system to know the user's location relative to the reference points. This is especially interesting for the blind and visually-impaired users.



Fig. 7. Navigation system application on the PDA

At the Netherlands, there is an existing on-line service with content about the reachability, accessibility and usability of buildings in Rotterdam. Search is possible by the name and address of the building or by the building category. A small map is also available for each building.

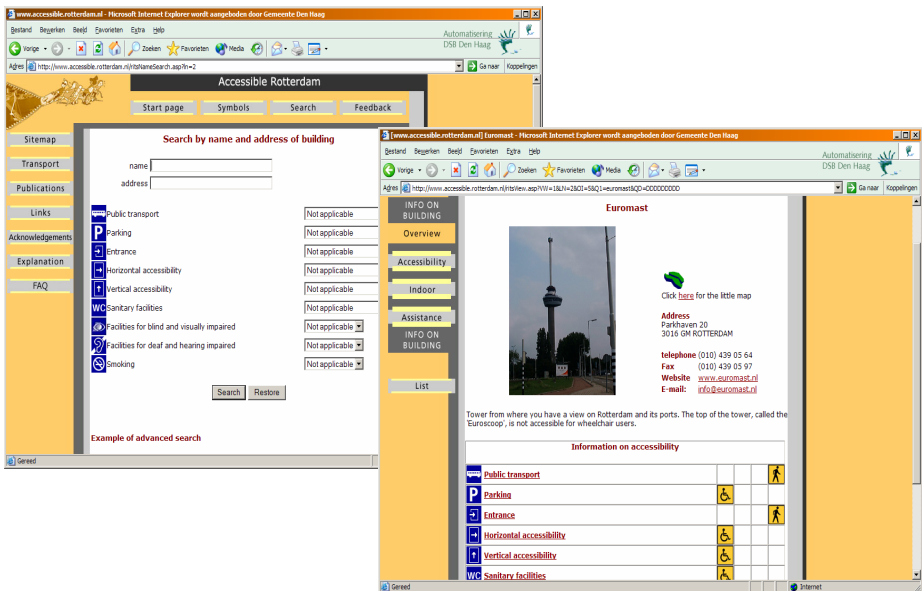


Fig. 8. On-line service with accessibility info of PoIs and transportation in the Netherlands

The examples of the PC-based services that were presented above, show that there is available infrastructure to start with, thus there is indeed a strong potential in strengthening the concept of independent mobility for the MI travelers through ASK-IT. Furthermore, ASK-IT sites plan to offer their citizens the same level of services when traveling to another ASK-IT site, through automatic roaming of service and transfer of the user personalisation profile with him/her, in his/her mobile or PDA. However, the diversity of content details, structure and furthermore, HCI concepts of all these services, makes their integration into the ASK-IT platform, with a unified HCI, a major challenge.

2.1 Use Cases Satisfied by the Pilot Sites

In ASK-IT, 42 detailed Use Cases have been determined. Each pilot site has generated the application scenarios that are to be performed at the tests, with clear correlation to the use case(s). Thus, the number of Use Cases satisfied in each site are determined and presented below, allowing a comparison among the sites. As it is expected, The Hague, as a satellite site, fulfills the lowest number of use cases.

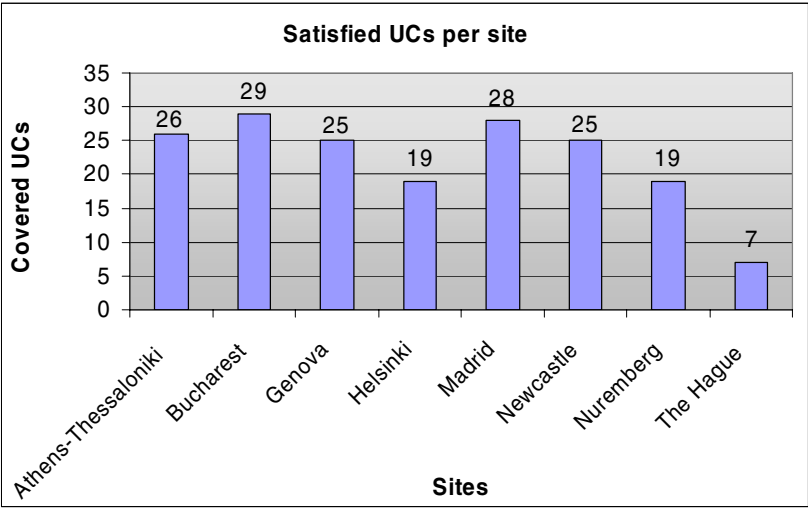


Fig. 9. Number of ASK-IT Use Cases covered in each site

In general, it can be concluded that there is a good coverage of the Use Cases, with the priority Use Cases being highly represented, according to Deliverable 4.1.1 of ASK-IT [3].

3 Conclusion

ASK-IT creates a new society of advanced sites throughout Europe. Through a common ontological framework, it interconnects the services of hundreds of service

providers from across Europe. This is the only way 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.

Currently, the existing web services and content are being interconnected to ASK-IT ontological framework and new content is being gathered. The ASK-IT pilots are expected to start in September 2007 and last for about 9 months, with 50 mobility-impaired users testing ASK-IT system and services in each site, of which 5 will have travel to other pilot sites (international trip) and 15 will use the system for longer (maximum 2 weeks), in order to test the long-term effects (user learning and personalisation issues). In the Satellite site, 10 users will participate in the short-term tests and 20 in the long term ones.

The aim is to demonstrate ASK-IT feasibility, interoperability and viability and provide adequate feedback to the development team for system optimization.

ASK-IT services will be offered through a unique and self-adaptive (according to user needs and wants, but also the context of use) interface through PC, PDA, intelligent phones, as well as, in-vehicle. The transition of proprietary, single services and even devices HCI to an integrated, self-adaptive and multi-platform HCI concept, applied and tested Europewide, constitutes one of ASK-IT key innovations.

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