

Aladdin – A Mobile Multilingual Traveller Platform for Travellers and Tour Guides

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Aladdin, an EU-fund research project, aimed to develop a mobile destination system prototype to manage different types of travel-destination's content. It will provide incoming tour operators with an optimised and cost-efficient mobile workspace to support their business processes, allowing small companies to compete with larger incoming tour operators. Additionally it will allow SMEs at the destination to offer their services and content in an attractive and easy accessible way to the potential customers and last but not least it will allow travellers to make themselves familiar at the destination. In this article some results achieved within the project are shown, starting with the discussion of today's challenges in tourist destinations and ending with some lessons learned from the system's evaluation.

Keywords: mobile information platform, tourism, information management, location based services

1 The Research Project Aladdin

European SMEs in the destination area of the tourism and travel industry are facing serious challenges due to the pressure exerted by large international companies. Incoming tour operators, tourist offices, restaurants and museums are typical

SMEs which need to provide different services for the traveller in a cost-efficient but attractive way. Being able to tailor offerings for the traveller or to handle last-minute changes for hotel-bookings are key issues for service providers at a travel destination. With the upcoming trends in travel business like the rising number of short trips and furthermore the highly volatile business processes, the need to handle the increasing complexity and therefore the costs of such transactions is becoming more and more crucial.

The EU-funded co-operative research project Aladdin (August 2005 – July 2007) aimed to develop the prototype of a mobile and multilingual information and communication system supporting services for tour guides, travellers and local SMEs. The Aladdin system provides incoming tour operators with an optimised and cost-efficient mobile workspace that supports their business processes and allows small companies to compete with larger incoming tour operators, while also allowing SMEs at the destination, such as local service and commercial companies, to offer their services and content in an attractive and easy accessible way to the potential customers. At last this system can assist travellers in taking the offers as well as assisting in different circumstances during their stay at the destination.

Detailed information
can be found at
<http://www.aladdin-project.org>

2 Status Quo in Destinations

The project started out with an analysis of requirements, leading to a detailed analysis of processes and weaknesses in travel destinations regarding all traveller and tour guide oriented activities. Especially the organisation and technical systems in the Aladdin destina-

tions Budapest, Stockholm and Wildschönau were investigated, using a uniform interviewing technique and documenting the results using event driven process chains (EPC).

Apart from the process analysis, industry standards in the tourism industry and for identity management systems were analysed, relevant broad band networks were described and usability requirements and constraints in the field of mobile devices for travellers and tour guides were collected. All this gave insight about potential and shortcomings and from these the Aladdin "new" services were derived. A detailed view of the analysis can be found in [Clarke et al. 2007].

But before looking at the business use cases that can be found at a tourist destination, the different kinds of participants acting in these use cases and the different trip types need to be introduced.

The participants can be divided into

- › individuals working in the tourism area at the destination, and
- › individuals that participate as travellers at a probably foreign destination.

The individuals working in the tourism area at the destination can further be subdivided into people working in direct contact with the travellers (mostly tour guides or tour representatives) and users working in the back office of a tourist organisation (e.g. tour organisers). While the users in the back office mostly have access to relevant information, tour guides and tour representatives are often on the road accompanying the travellers and due to this fact most probably not able to access needed information.

Individuals that participate as travellers can be divided by the reason why the trip is undertaken as well as the way the trip will be done. This leads to the

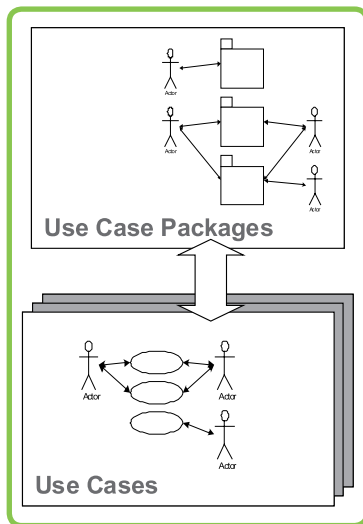


Figure 1: Overview of Aladdin Use Case Model Elements

morphological box shown in table 1.

The first distinction leads to two instances, the leisure trip and the business trip. The second differentiation relates to the degree of individuality, and leads to four different types of trips. First, people planning and making their trip without or with little assistance are so called "individual trip travellers". During their stay these travellers need some kind of support in getting information about the destination, like special offers, points of interests, opening times of localities, etc., to be able to organise their trip on their own. On the other side of the spectrum travellers take part in a so called "mass package trip" in which the entire stay at the destination takes place together with the travel group with no or very little individuality. They are mostly accompanied by a tour guide, so there is no need for requesting individual information about the destination, but travel group oriented assistance (especially for the tour guide) will be welcome.

Between these two poles the "individual package trip traveller" and the "MICE trip traveller" can be found (the acronym "MICE" stands for "Meetings, Incentives, Conventions, Exhibitions" and refers to a spe-

Criteria	Possible Extensions			
Trip type	Leisure trip		Business trip	
Grade of individuality	Individual trip	Individual package trip	MICE trip	Mass package trip

Table 1: Morphological Box of Trip Types

cial, business oriented travel segment). Both trip types are a mixture of previously planned components but with much more individuality. The MICE trip can be seen as a trip in between mass package trip and individual trip. This kind of trip, mainly consumed by business travellers, consists of previously planned business events (e.g. an exhibition or a fair) and individual parts, that are offered and booked at the destination.

All these different user groups as well as the way they do their trips have to be taken into account when developing the travel oriented business use cases in the destination which are discussed in the next section.

2.1 Business Process Model

In general any trip (business or leisure) can be subdivided into three stages: The preparation, the execution and the reevaluation of the trip. In Aladdin we concentrated on the business processes and use cases that take place at the destination of a trip, so we focused on the processes during the 2nd stage of a trip, leading to business processes that deal with:

- › Pre-arrival activities
- › Arrival of the traveller at the destination (e.g. meeting the guide at destination if necessary)
- › Hotel arrival and check-in
- › Transportation management
- › Guided tours
- › Meals
- › Leisure management
- › Business management
- › Accommodation management
- › Leaving the destination.

2.2 Problems and Challenges in Destinations Today

During the analysis of the business processes common problems in today's tourist business have been identified. Those problems can mostly be seen as so called "ad hoc" changes that can not be foreseen and planned. Typical problems are:

- › Baggage of the traveller is lost
- › The awaited tour guide is not present
- › The planned bus is not present
- › More or fewer travellers arrive in a group
- › The program during operation needs to be changed
- › The restaurant and/or menu needs to be changed
- › The room distribution needs to be modified
- › The traveller has special wishes
- › The traveller gets sick and needs medical assistance
- › The traveller gets lost somewhere in the destination.

From a general view, these issues can be seen as challenges that arise on all kind of trips mentioned above. Only the responsibility to solve the problem changes between the tour guide/tour representative and the individual traveller depending on the kind of trip.

Being able to solve an appearing problem in a fast and unproblematic way will undoubtedly improve the levels of customer satisfaction (either with the tour guide/tour representative or in the destination in general). And in most cases access to information (e.g. "How do I find the next bus that fulfils my needs to come to the hotel?") is the

gist of the matter for solving the problem. This is why we focused in the next step – the definition of a use case model – on supporting the users in overcoming such situations by using a mobile IT solution, enabling the users for example to access either static or dynamic destination information.

3 Aladdin Use Case Model

During every business process different "services" can be found that fulfil Aladdin requirements: the possibility to be supported by a mobile multilingual traveller platform, usable by tour guides as well as by travellers.

The services of Aladdin are described within a use case model, using the "Unified Modelling Language" (UML) as the modelling notation. Due to the fact that the descriptions elaborated should also be immediately clear to non-IT specialists, it was decided to only use those parts of the UML, which are especially dedicated to communicating specifications to end-users ("use cases"). A general introduction to UML can be found in [Podeswa 2005] or [Eriksson & Penker 2000].

UML is a standard notation for describing software systems, which has received wide acceptance in the software industry. Details about UML, including the specification, are available at <http://www-306.ibm.com/software/rational/uml/>

Figure 1 gives an overview of the different model elements and their interrelationships within the use case model, which are explained in the following diagram.

- › Use Cases: A use case is a modelling component of the UML and "specifies a sequence of actions, including variants, which the system can

perform and which yield an observable result of value to a particular actor." [Jacobsen et al. 1999] Accordingly, a use case describes functionality and the involved actors (either a human user or a system with interfaces to the system being modelled).

- › Use Case Packages ("UCP"): A use case package is a set of related use cases, combining these to form a semantic unit.

The complete model including all use case descriptions in detail is explained in the "Aladdin Reference Specification" which is publicly available on the Aladdin project web server via the URL <http://www.aladdin-project.org> [Aladdin 2006].

3.1 Overview of Use Case Packages

As a result of the research in the destination nearly 100 single use cases could be identified. They were grouped into 13 use case package, grouped into four different clusters according to the main focus of the use case packages. See figure 2 and the description below:

Administration: In this cluster all use case packages dealing with the management of the information that is stored or needed for the execution of the mobile multilingual traveller platform are summed up.

- › Administration of Destination Info: This UCP contains all use cases dealing with the administration of the destination information used throughout the whole Aladdin system (e.g. storing and maintaining POI-information, translating content managing the system access).
- › Administrative Tools: Within this UCP administrative issues of the system (e.g. managing different user profiles, sending mes-

sages or setting up the client environment) are addressed.

- › Quality Assurance: This UCP includes different use cases dealing with the quality of the services offered (determining customer satisfaction via questionnaires, complaint management).

Use of Information: In many processes and use cases access to information stored in the system is needed (e.g. POI information like information about possible accommodation opportunities).

- › Use of Destination Info: This UCP covers all use cases that deal with access to the destination information that is stored in the Aladdin system (e.g. POI information, route information, emergency information).

POI means "Point of Information". A POI can be tourist and non tourist locations e.g. restaurants, museums, lake shore promenades, casinos but also hospitals, shops, post offices, train stations, taxi stands.

Financial Aspects: Another relevant area of use cases can be seen in supporting the payment of the different offers at the destination.

- › Payment and Ticketing: All use cases that handle payment issues for offered activities (business activity, leisure activity, guided tour) are pooled in this UCP. It also includes use cases that enable the distribution of promotional messages and the management of mVouchers (voucher that is managed via mobile technologies and not by distributing paper).

Organisation Travel and Conduction of Tours/Activities: This cluster of use case packages contains use case packages which deal with the organisation of the actual stay at the destination.

UCPs dealing with coming to and leaving from a destination.

- › **Arrival:**
All use cases that deal with the arrival of a traveller at a destination are contained in this UCP (checking the attendance of a traveller group, management of ad hoc changes during arrival).
- › **Departure:**
Being a counterpart to the "UCP Arrival", this UCP contains all use cases that are linked to the departure of a traveller (checking flight information, dealing with ad hoc changes during departure).

UCPs dealing with offers that are made by travel agencies, incoming tour operators, etc.

- › **Guided Tours:**
A main activity at destinations is the execution of guided tours, where a tour guide guides a group of travellers. All identified use cases in this area (during definition as well as during execution) are incorporated in this UCP (e.g. use cases to define a guided tour, use cases that enable the tour guide to call the group members during execution).
- › **Leisure Activities:**
All use cases dealing with the planning and execution of leisure activities are incorporated in this UCP. In contrast to guided tours, leisure activities are undertaken by the traveller without the attendance of a tour guide.
- › **Business Activities:**
Keeping in mind that business and leisure travellers have different reasons for travelling, this UCP covers all use cases that are mainly for business traveller purposes. In particular this means dealing with a business program.

UCPs dealing with offers by local service providers:

- › **Organisation of Accommodation:**
This UCP groups together all

use cases dealing with the organisation of accommodation at the destination (e.g. planning the accommodation of a traveller/travel group, dealing with ad hoc changes).

- › **Organisation of Transport:**
This UCP groups together all use cases dealing with the organisation of the transport at the destination (e.g. planning the transport of a traveller/travel group, dealing with ad hoc changes).
- › **Organisation of Meals:**
This UCP groups together all use cases dealing with the organisation of meals at the destination (e.g. planning the meal of a traveller/travel group, dealing with ad hoc changes).

Using the nearly 100 defined use cases, that are explained in detail in the "Aladdin Reference Specification" mentioned above, most of the situations in a destination that are appropriate for an mobile software platform like the Aladdin prototype can be addressed. Those situations – with their corresponding use cases shown in brackets – are for example:

- › A tour representative checks the attendance of traveller group members, e.g. at the airport/train station/etc. ("Check Attendance of Travel Group Members").
- › In order to support travellers in organising their business program, the tour organiser wants to create a business program and adjust it with

the traveller/traveller group. A business program consists of one or several business activities ("Manage Business Program").

- › Either the traveller wants to know up-to-date information on his next flight or the tour representative wants to look up flight information for a traveller. Or the traveller receives an automatically generated SMS a defined time span before departure including the flight information ("Check Flight Information").
- › A tour guide wants to recollect their group members during a guided tour/excursion ("Make 'Meeting Point Call'").
- › Travellers want to inform themselves about offered leisure programs ("Browse Leisure Program").
- › Ad hoc changes can lead to changes of the accommodation plan. These changes have to be dealt with ("Manage Ad hoc Changes within UCP OA").
Ad hoc changes could be:
Minor changes within the same accommodation (e.g. traveller requests a different type of room like wheelchair-suitable room, non-smoking room, softer bed) or minor incidences in hotel assignment, or
Major changes (e.g. traveller requests a different accommodation) or major incidences in hotel assignment
- › Based on concrete transport data (target destinations,

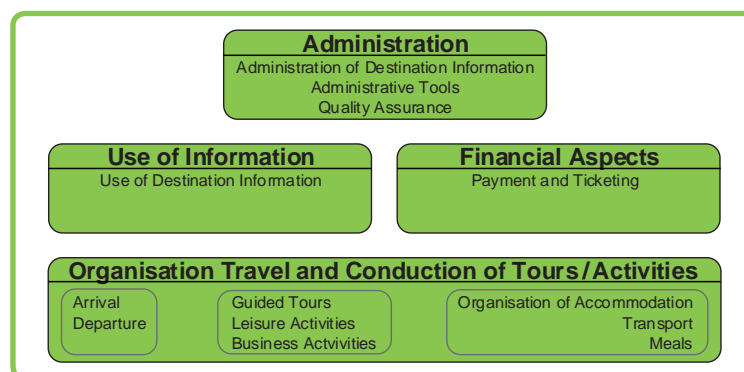


Figure 2:
Clustering of Use
Case Packages

- date, time, number of persons) the tour organiser plans and organises (creates, updates, deletes) transport jobs in co-operation with transport service providers ("Manage Instance of Transport").
 - › A tour guide or a tour representative sets the payment status of a guided tour's participant ("Set Payment Status").
 - › A traveller trades in an mVoucher to get a discount for a specific service ("Trade in mVoucher").
 - › Traveller or tour guide performs a vicinity search in order to find a POI nearby ("Search for POI Nearby").
 - › A traveller or tour guide requests a translation of phrases into another language ("Request Ad hoc Translation").
 - › A traveller wants to visit a POI and calculates a route from their current position to the POI or between two POIs ("Request Route to POI").
 - › A traveller or tour guide is in a situation where he needs some help ("Request for Assistance").
 - › A traveller wants to contact his tour guide ("Send Message to Tour Guide").
- If a system is able to support such kinds of situations, it will likely to be seen as beneficial for the user. Additionally it should be clearly stated that such a system only plays a role as an assisting and supporting system, enabling the SMEs at the destination to improve their customer service or to assist travellers at destinations to get needed information.

4 Samples of the Aladdin Prototype

The development that was undertaken during the project was based on the use cases and led to a service oriented architecture with different applications

for both environments, the tour guide/representative (named Professional Mobile Workspace – PMW) as well as the traveller (called Mobile Traveller Environment – MTE). Figure 3 and 4 show some screenshots of possible Aladdin services (in the traveller application MTE).

In the first example (see figure 3) a local search is executed. After selecting the "Aladdin Travel"-application on the mobile phone, a top-level menu is shown to the user. Having selected the menu item "Local search", the user has to enter some information like type of POI to search for (restaurant, museum etc.), geographical search radius, etc. After having executed the search the system shows the results in a map as well as in a list of resulting entries, so the user can see the results and their geographical position on the map and access more detailed information about the POI like entrance fees (for a museum), opening times or special offers, using the Aladdin application on his mobile phone.

In the second example (see figure 4) the search for flight information is shown. First the user needs to select the menu item "Flight data" to open a dialogue. In this dialogue he enters his booking number and gets the up to date flight information as a result.

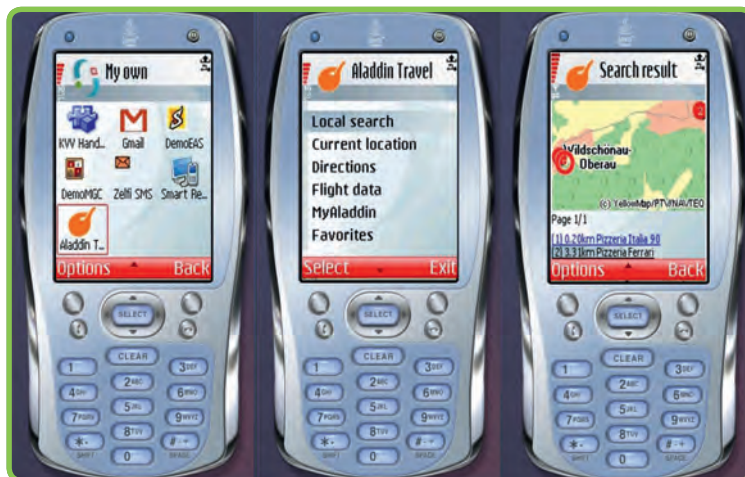


Figure 3:
Example of
Aladdin Services
– Search for POI

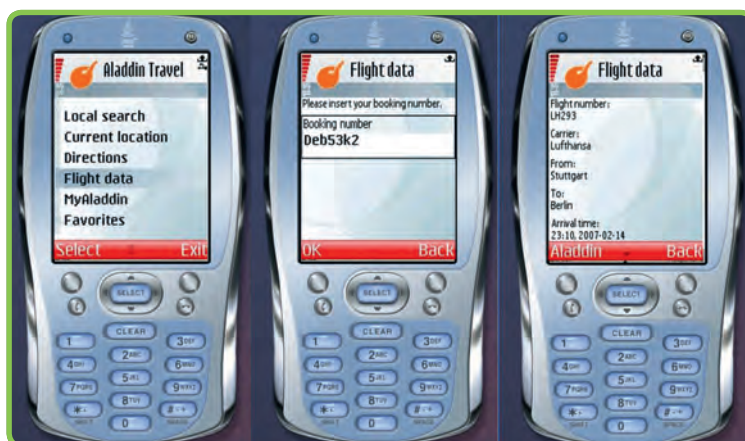


Figure 4:
Example of Aladdin
Services – Search for
Flight Information

5 Evaluation

In the last three months of the project, the Aladdin prototype for the travellers as well as the prototype for the tour guide were tested by an expert evaluation done by usability experts, by an usability test having travellers and tour guides use the applications, and by pilot and field tests in the three Aladdin destinations Wildschönau, Budapest and Stockholm. The main objective of the evaluation was to test the prototypes regarding usability

ity and intended functionality in the perspective of a user SME, a technology SME, and the Aladdin RTD partners.

Based on the results of the examined tests it can be concluded that the Aladdin system prototype is technically a rather mature product which delivers a series of solutions for problems encountered when visiting and working in a travel destination. Particularly for the traveller application, the information on POIs, the description of their locations and the way to find them as well as the real-time information on weather or traffic in the destination combined with the need to have an emergency support show that Aladdin could have a clear focus. In case of the tour guide/tour representative application, the communication with the back office and the travellers, extensive booking information as well as POI information can solve problems in the work field of tour guides and the correspondent organisations.

The results of this evaluation show that supporting the daily needs of the end user within a mobile application is of vital importance. This implies that end users' participation during the design and development process of applications is given. A detailed description of the evaluation is given in the project deliverable "Evaluation Report" (Aladdin 2007), which is publicly available at <http://www.aladdin-project.org/publicdocu.html> and describes the quantitative and qualitative results of the examined tests in detail.

6 Summary

As one major result of the process analysis, done in the first months of the Aladdin project, common problems of today's travel business, being challenges that arise on all kind of trips mentioned above, were detected. Being able to solve the present problem in a fast



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and unproblematic way will undoubtedly improve the customer satisfaction (either with the tour guide/tour representative or with the destination in general; this is especially valid if the traveller is on an individual trip and as such left on his own devices to solve the problem). And in most cases access to up-to-date information is the gist of the matter for solving the problem. So the development of use cases to be supported by such a mobile multilingual traveller platform, usable by tour guides as well as by travellers, kept all

use cases of a tourist destination, that are relevant for such a system, in mind, focusing especially on offering assistance in situations that are known to be problematic today.

External factors such as the continuous growth of European tourism market, the growing number of mobile phone users, the growing numbers of those who also take their mobile devices with them when they travel, and the shifts observed and forecast in traveller behaviours opens a promising user market for Aladdin and support

the need for such a system. The development towards more frequent and shorter holidays for example comes along with a more dynamic and less predictable market for destinations. A system like Aladdin will enable access to different kind of information as well as to routing and communication capabilities especially if the person looking for this information is on the way in the destination. Thus the Aladdin system will be a tool to offer better service to travellers, either directly, when the traveller is using the Mobile Traveller Environment client on his own, or indirectly, when the tour guide/tour representative can deliver better services to the traveller using his Professional Mobile Workspace client.

The target group analysis demonstrated that a real necessity exists to optimise working processes of an incoming tour operator and of the tour guides that

work with them. With Aladdin it would be possible to improve these processes throughout the traveller destination experience. The delivery of personalised navigational and location based services in Aladdin coincides with the requirements and needs of travellers to access such systems. So as a summary of strengths, it can be said that the Aladdin system, combining both B2B and B2C environments, can function as an interactive, personalised and continuously updated guidebook and work tool for both, travellers as well as tour guides/tour representatives.

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