

CiViTAS
Cleaner and better transport in cities

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Aalborg

T68.1 Pre-Trip and On-Trip Mobile Phone Information in Aalborg

Aalborg Kommune
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1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for City-VITALity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme); CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by:

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS

- CIVITAS is co-ordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories’ for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

1.3 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

1.3.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain); and
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport company features as a partner in the proposed project.

2. Aalborg

The City of Aalborg, with extensive experience of European cooperation and having previously participated in CIVITAS I (VIVALDI) as a 'follower' city, is coordinating the consortium and ensures high quality management of the project. The City has the regional public transport authority (NT) as a local partner, and framework agreements with various stakeholder organisations.

Aalborg operates in a corridor implementing eight different categories of measures ranging from changing fuels in vehicles to promoting and marketing the use of soft measures. The city of Aalborg has successfully developed similar tools and measures through various initiatives, like the CIVITAS-VIVALDI and MIDAS projects. In ARCHIMEDES, Aalborg aims to

build on this work, tackling innovative subjects and combining with what has been learned from other cities in Europe. The result is an increased understanding and experience in order to share with other leading cities and learning cities.

Aalborg has recently expanded its size by the inclusion of neighbouring municipalities outside the peri-urban fringe. The Municipality of Aalborg has a population of some 194,149, and the urban area a population of some 121,540. The ARCHIMEDES corridor runs from the city centre to the eastern urban areas of the municipality and forms an ideal trial area for demonstrating how to deal with traffic and mobility issues in inner urban areas and outskirts of the municipality. University faculties are situated at 3 sites in the corridor (including the main university site). The area covers about 53 square kilometres, which is approximately 5 % of the total area of the municipality of Aalborg. The innovation corridor includes different aspects of transport in the urban environment, including schools, public transport, commuting, goods distribution and traffic safety. The implementation of measures and tools fit into the framework of the urban transport plan adopted by the Municipality.



Figure 1: The ARCHIMEDES Corridor in Aalborg

3. Background to the Deliverable

Although significant emphasis is put on securing quality of public transport in Aalborg, delays do still occur, and sometimes passengers report feeling uncertain if the bus is delayed, or if they themselves have arrived too late at the bus stop. Uncertainty about planned and actual departure times and the location of bus stops are some of the barriers that discourage potential passengers from using public transport. The availability of Real Time Passenger Information prior to getting on a bus and on board information (via screens, ARCHIMEDES measure 69) is expected to lower these barriers and give the traveller “peace of mind”. At the same time the systems contribute to improving the image of public transport as a modern means of transport and thereby helping public transport to appear as an attractive alternative to car use.

In this measure, a mobile portal for public transport has been developed, including a set of Location Based Services (LBS) for mobile phones (based on the mobile phone’ GPS).

The LBS includes Real Time Passenger Information (RTPI) from 30 nearest bus stops selected from the present GPS position, and a ‘Take Me Home’ service that gives the user a

combined walking and PT trip from their present GPS position to your predefined Home address. It achieves this by integrating the GPS position, and saved user information, with the national Journey Planner.

The complete IT infrastructure for delivering RTPI including busPc and backoffices system with prognoses algorithms in Aalborg were planned as part of EU project VIKING and implemented during the CIVITAS I VIVALDI project.

As part of the VIVALDI project, RTPI was implemented on 40 variable message signs (VMS) at major bus stops in Aalborg. The information has proved to be of great benefit for public transport users and as a consequence is helping to maintain uptake of public transport, although it does only cover the most important bus stop in Aalborg. Equipping bus stops with VMS is very expensive and is therefore only possible for major stops with a high customer flow. But in Denmark, almost everyone aged over 8 carries a mobile phone. So by using these mobile phones as VMS for RTPI, the information is spread to all people and all bus stops; the investment is taken up by the users and the technology is always kept up-to-date.

As a consequence of this, a mobile service was implemented as part of the EU MIDAS project. This service was menu based prompting the user to choose in a three level menu before the RTPI were presented. In this way, it was possible to get round the two problems of the customer not knowing the precise name of the bus stop, and the difficulties of keying long names on a mobile phone.

As an even better solution it is now possible to skip the menus and present the user for RTPI based on the users GPS position. As a parallel, an interface to the national Journey Planner have been develop, where keying in is substituted by either GPS positions or predefined locations. The approach used in ARCHIMEDES provides information in a convenient manner that is expected to increase user satisfaction among present users and potentially attract new users to public transport including tourists unfamiliar with the public transport system, thereby expanding the market for public transport.

3.1 Summary Description of Task

The measure introduces three different new public transport mobile phone features.

The first feature is “NTmobil.dk”, which is a mobile phone platform integrating different PT mobile services. The second feature is a Location Based Service that provides RTPI via mobile phone on the nearest bus stops, based on GPS. The third feature is the “Take Me Home” feature based on GPS data, that saves user data and the National Journey Planner provides the user with public transport information.

4. Pre-Trip and On-Trip Mobile Phone Information in Aalborg

4.1 Description of Work Done

4.1.1 Planning Phase and Development

This task have been planned and implemented by a working group consisting of ARCHIMEDES’ measure leader, two members from Nordjyllands Trafikselskab (NT) (Public Transport Authority of North Jutland) and a planner from the Department for Sustainable

Development of the City of Aalborg. Within the working group, ideas were discussed, the solution designed and the project has been implemented.

The planning started in the winter 2008 and the strategic decisions were taken during 2009. Different possibilities for the framework were discussed. It was decided to subcontract with an IT company for the mobile portal. A decision was taken to work with the National Journey Planner Cooperation (Rejseplanen A/S) on the GPS based RTPI and the 'Take me Home' function, since this would offer the best end-user product. The National Journey Planner Cooperation, owned by the Public Transport Authorities in Denmark, was ready to implement an application with similar GPS function to what was described in the full ARCHIMEDES project description as a goal for this measure. Therefore, it was decided to benefit from the synergy effects by building upon this National Journey Planner service and implement RTPI for the bus users in the Journey Planner.

Different features of the measure were discussed and it was decided to focus on the three features:

1. the development of the mobile platform "NTmobil.dk",
2. the Location Based Services providing RTPI via mobile phone on the nearest bus stops, based on GPS, and
3. the "Take Me Home" feature for mobile phone based on GPS data and the National Journey Planner.

4.1.2 Implementation

The mobile platform, NTmobil.dk, included a slight makeover of the mobile phone RTPI system, originally from the MIMOSA project, which had been launched early in 2010. The 'Take Me Home' and the new GPS based RTPI were launched as a java application in October 2010. Migration of the functionality to HTML5 is expected to be launched in the next phase.

4.2 Specification of Pre-Trip and On-Trip Mobile Phone Information

4.2.1 Specification of NTmobil.dk



**Figure 2: NTmobil (<http://ntmobil.dk/>)
 the platform for mobile phone users providing different public transport services**

The mobile platform NTmobil.dk is a platform where mobile phone users can access a range of mobile PT features such as buying a SMS ticket, getting RTPI information and accessing personalised travel information created via ARCHIMEDES measure 9 'Modernizing travel information'. With the fast technological development of mobile phones it is expected that NTmobil.dk will be further developed along with the change in technological possibilities and user needs.

At the moment, five different choices are offered on NTmobil.dk (see Figure 2).

The first possibility is the RTPI system NTLive that allows passengers to check if buses are on-time and to get information on eventual major changes or disturbances such as heavy snow.



Figure 3: NTLive showing RTPI in a browser. Showing delays due to snow.

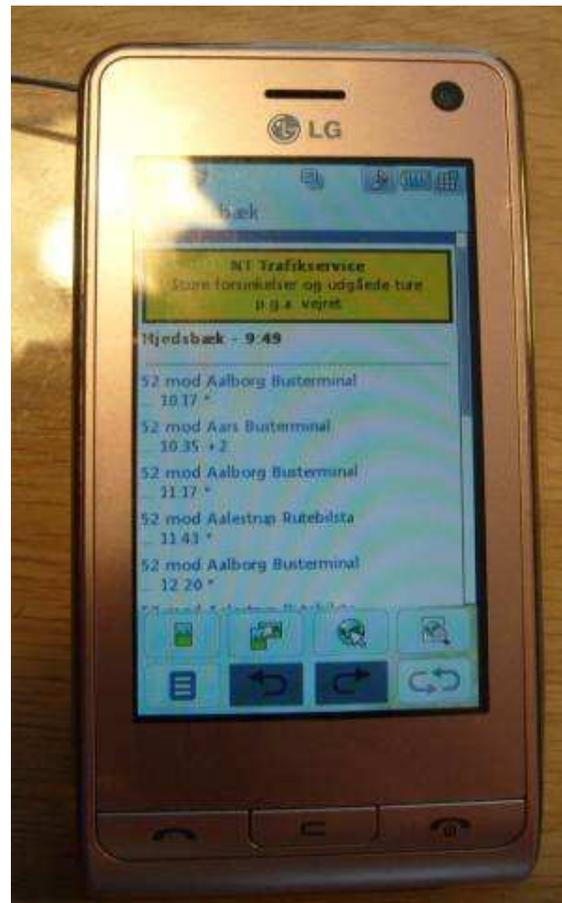


Figure 4: A warning is displayed due to heavy snow. More bus trips are cancelled

The second possibility is the Mobile ticket, allowing the passenger to buy a ticket via the mobile phone by sending a text message.

The third possibility is Rejseplanen, 'the National Journey Planner' offering the user journey planning information with access to all public transport in Denmark supplemented by map based walking instruction from address to bus stop.

The fourth possibility is an integration of functions based on personalised travel information from MitNT (ARCHIMEDES measure 9). For example, actual real time information and disruptions for the users preferred routes and bus stops.

Last but not least, the menu item NEntertainment offers different forms for entertainment to the passenger during travelling.

4.2.2 Specification of the GPS based RTPI

The NTLive JAVA application is an expansion of the functionality and an improvement of user interface of the HTML based mobile phone RTPI system. The LBS includes RTPI from 30 nearest bus stops selected from the present GPS position.

At the present it is not possible to access the mobile phones GPS from a build-in browser.¹ To reach the goals for this task, it has thus been necessary to develop a JAVA application, even though it is still generally accepted that having to install an application constitutes a barrier for many customers. Fortunately, this barrier is less significant for the target group for this task, mostly being young people.

When using the JAVA application, the application uses the phone' GPS to position the user. The 30 nearest bus stops are found and presented to the user – sorted by closest first and with an option to see all stops on a map instead. When a bus stop is selected, the RTPI from this stop is shown for the next 50 departures with an option to see even more. Off course it is still possible to choose a stop or a terminal further away by typing in the name. The time displayed is the scheduled departure time, supplemented with any eventual delay in minutes. Times marked with * mean that the bus has not yet started driving, so no real time information is available. After having selected one departure you can *click* the departure time and see the whole trip for that bus, with prognosis for the rest of the trip.

All buses running for the day and the next can be shown on the departure board. Of course, RTPI is only relevant for an hour or so forward, but as planned departure times are shown for the next day, people tend to use the mobile phones as a replacement for a printed timetable.

The service is free except for ordinary data traffic costs which are very low in Denmark.

For illustration purposes the pictures below is from the English version. The language is Danish as standard, but English is an option in the 'preferences' menu.

¹ This will change in HTML5 but the HTML5 standard was not available at the time of this development. It is the intention to migrate the system to HTML5 later.



Figure 5: Chose among 30 nearest stops

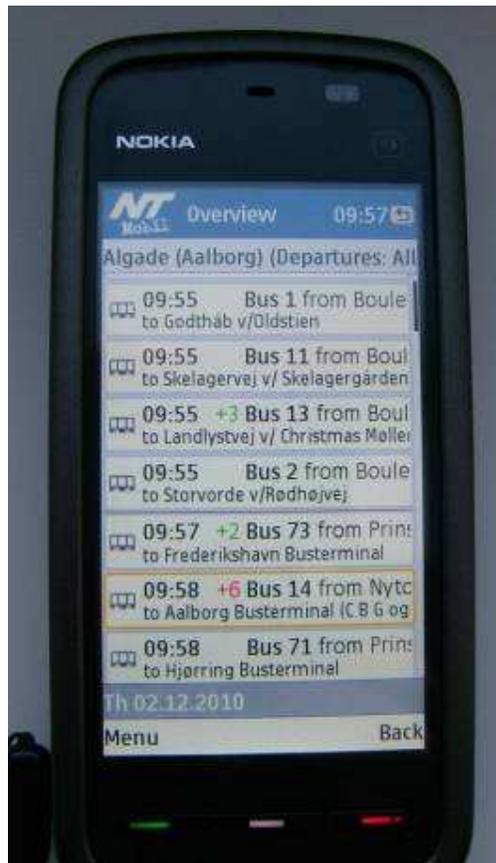


Figure 6: After that, the display shows the next departures from the chosen bus stop with route number, direction and time. Notice three trips being delayed!

4.2.2 Specification of the “Take Me Home” Feature

The ‘Take Me Home’ service is another menu item in the java application. This function gives the user a combined walking and PT trip from present GPS position to the users predefined Home address. It achieves this by integrating GPS positions and saved user information with the national Journey Planner.

To start, the user would define their home address in the programs settings. When journey advice home is required the user would just need to push the programs ‘Take Me Home’ button. The program will then find the three first possible public transport journeys from your present GPS position to your home address from the national journey planner, including possible walking trips to and from the bus stops.

Due to the national journey planner containing data on all public transport and all bus stops and train stations, this function can take the user home from anywhere in Denmark.

Of course, if required the user can choose another destination than Home, or a later departure time than Now’.

Besides using the program pre-trip to find the right PT journey, integrating the GPS in the program's search makes the program a good help on-trip. If PT is delayed or interchanges between buses or train fails the GPS based search from current position is a fast and reliable way to reschedule your trip.

This GPS based 'Take Me home' function is expected to significantly lower the barrier against using public transport among infrequent PT users.



Figure 7: Take Me Home button requests the journey planner with Current position as departure, predefined Home as destination and Now as departure time



Figure 8: The next 3 connections with PT is proposed

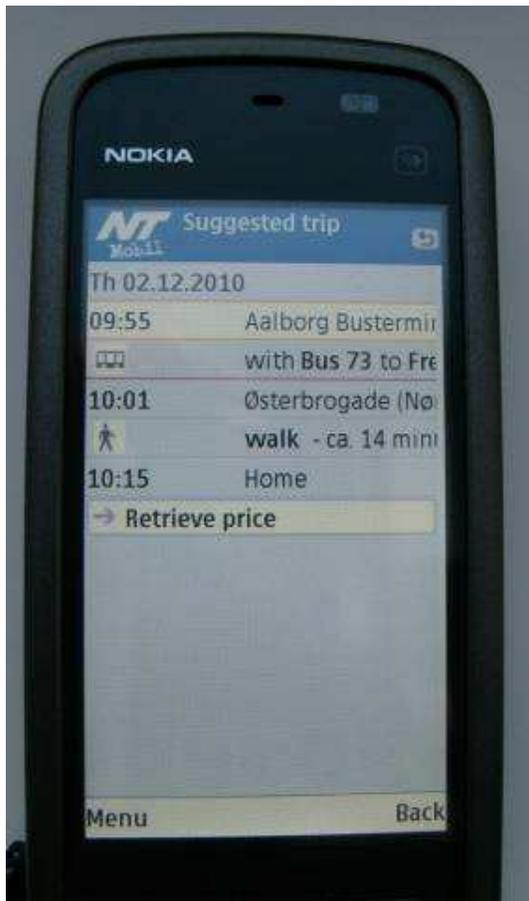


Figure 9: By clicking one of these, the detailed information on the trip is presented.

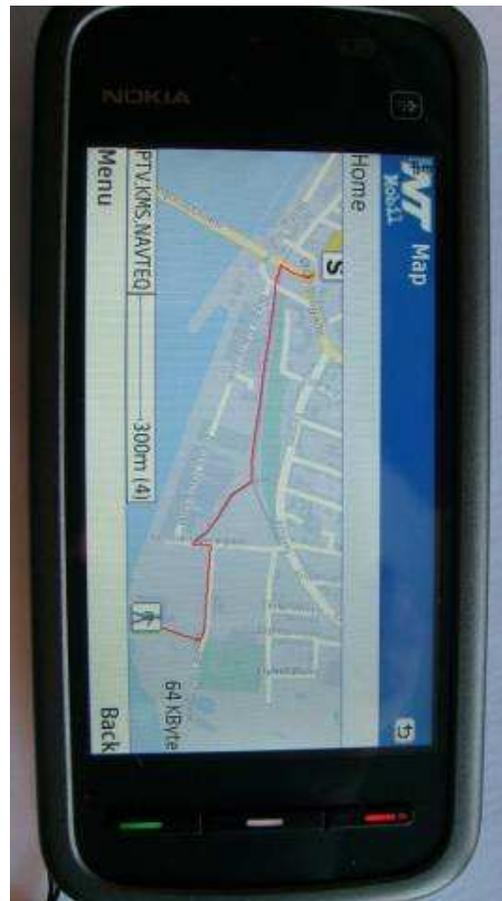


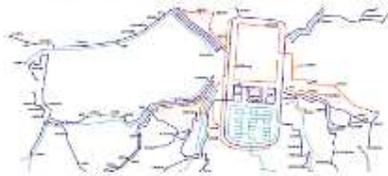
Figure 10: As an option, the walk from current position to first bus stop, is presented on a map.

4.3 Communication

Communication has been important for this measure with a consistent layout and the gathering of the different features on NTmobil.dk.

The marketing of NTmobil.dk started in spring 2010. The marketing campaign consisted of flyers (Figure 11), posters (Figure 12) and magazine advertisement (Figure 13) introducing and explaining NTmobil.dk. The information screens in the buses (ARCHIMEDES measure 69) are also being used to advertise for the mobile phone features (Figure 14). In addition, advertisement for NTmobil.dk was placed in the introduction handbook for the new students (Figures 15 and 16) in September 2010. As for the marketing of NTLive and the Take Me Home feature, those were a part of the overall marketing of NTmobil.dk.

NTmobil.dk brug mobilen, når du skal med bussen



Gå ind på NTmobil.dk i din mobiltelefons browser. Her har vi samlet alt det, du har brug for, når du skal med NT

-  **live**
Tjek om bussen er forsinket på NT live
-  **mobil billet**
Køb mobilbillet til bussen eller Nordjyske Jernbaner*
-  **rejseplanen**
Planlæg din rejse på rejseplanen
-  **mit nt**
Se din personlige side med udvalgte ruter og stoppestedsinformationer på Mit NT
-  **NTertainment**
Klik ind på NTertainment, hvis du keder dig på turen

*NB: Mobilbilletten kan ikke benyttes i DSB-tog

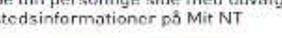


Figure 11: NTmobil.dk flyer

NTmobil.dk brug mobilen, når du skal med bussen



Gå ind på NTmobil.dk i din mobiltelefons browser. Her har vi samlet alt det, du har brug for, når du skal med NT

-  **live** 
Tjek om bussen er forsinket på NT live
-  **mobil billet** 
Køb mobilbillet til bussen eller Nordjyske Jernbaner*
-  **rejseplanen** 
Planlæg din rejse på rejseplanen
-  **mit nt** 
Se din personlige side med udvalgte ruter og stoppestedsinformationer på Mit NT
-  **NTertainment** 
Klik ind på NTertainment, hvis du keder dig på turen

*NB: Mobilbilletten kan ikke benyttes i DSB-tog



Figure 12: NTmobil.dk poster

NTmobil.dk brug mobilen, når du skal med bussen

Gå ind på NTmobil.dk i din mobiltelefons browser. Her har vi samlet alt det, du har brug for, når du skal med NT.

- live**
Tjek om bussen er forsinket på NT live
- mobil billet**
Køb mobilbillet til bussen eller Nordjyske Jernbaner*
- rejseplanen**
Planlæg din rejse på rejseplanen
- mit nt**
Se din personlige side med udvalgte ruter og stoppestedsinformationer på Mit NT
- NTertainment**
Klik ind på NTertainment, hvis du keder dig på turen.

*NB: Mobilbilletten kan ikke benyttes i DSB-tog

www.AalborgKommuneTrafiketselskab.dk

Figure 13: NTmobil.dk advertisement



Figure 14: NTmobil on bus screens (Measure 9) Manipulated view.

NTmobil.dk brug mobilen, når du skal med bussen

Gå ind på NTmobil.dk i din mobiltelefons browser. Her har vi samlet alt det, du har brug for, når du skal med NT.

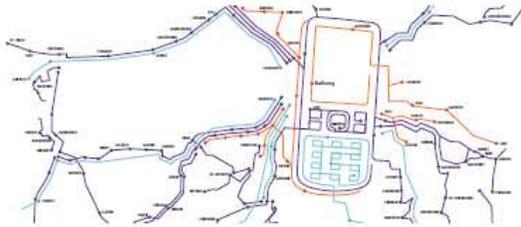
- live**
Tjek om bussen er forsinket på NT live
- mobil billet**
Køb mobilbillet til bussen eller Nordjyske Jernbaner*
- rejseplanen**
Planlæg din rejse på rejseplanen
- mit nt**
Se din personlige side med udvalgte ruter og stoppestedsinformationer på Mit NT
- NTertainment**
Klik ind på NTertainment, hvis du keder dig på turen.

*NB: Mobilbilletten kan ikke benyttes i DSB-tog

AALBORG KOMMUNE

Figure 15: NTmobil.dk advertisement in the introduction-handbook for new students

NTmobil.dk use your mobile, when travelling by bus



Go to NTmobil.dk in your mobile phone's browser. Here you'll find all you need, when travelling by public transport in and around Aalborg

-  **live**
Check if the bus is late on NT live
-  **mobil billet**
Buy mobile tickets to NT's busses or Nordjyske Jernbaner*
-  **rejseplanen**
Plan your journey on rejseplanen
-  **mit nt**
Check out your personal site, with bus-routes and bus-stop information on Mit NT
-  **NTertainment**
Click on NTertainment, if you are bored

*NB. The mobile tickets are not valid for use in DSB trains



Figure 16: NTmobil.dk advertisement in the introduction-handbook for new students, English version

In order to test new information channels ARCHIMEDES recorded 3 small humorous campaign movies featuring the Take Me Home function, to be played on the information screens in the buses and to be promoted on YouTube.com. (See Figure 17)



Figure 17. Youtube promotional movie for the 'Take Me Home' function

The most common way for users to get the JAVA application will be from the websites of NT, the City of Aalborg and Trafikken.dk/Nordjylland (measure 9) or the journey planner website, Rejseplanen.dk.

4.4 Problems Identified

The big challenge in this measure is the speed of technological development when it comes to mobile phone applications. When including the GPS dependent mobile phones functions in the proposal for a FP7 project, this was very innovative and ambitious and there was even reasonable uncertainty, if it would be possible to develop such a function in the project period. But with the launch of the iPhone and Android, and the open programming interfaces associated with these systems, some of the GPS based journey planner functions is already being created by third party developers, as for example private talented young people

It is a barrier to the spread of the GPS based RTPi and the Take Me Home function, that the present inability for a Browser to access the mobile phones GPS, makes it necessary for the user to download and install a program to access the functions. There is still unwillingness

among ordinary users to do so. Luckily, this unwillingness is less prevalent amongst young people which comprise the target group for this measure.

4.5 Future Plans

It is planned to migrate the java functions to HTML5 as soon as possible, and there by bypass the barrier against the spread of the function, described above.

Evaluation of the measure will be conducted according to the measure evaluation plan.

Appendix 1 Abbreviations

busPc: An on-board computer in PT buses. Controlling the passenger related function in the bus including GPS position to RTPI systems and bus priority at intersections.

FP7: The Seventh Framework Programme

GPS: The Global Positioning System is a satellite-based global navigation system (GNSS) that provides reliable location information.

HTML5: The next major revision of the HTML (HyperText Markup Language) standard, currently under development.

JAVA: Java is a general-purpose, portable, programming language that is designed to have as few implementation dependencies as possible.

LBS: Location-Based Service, information services accessible with mobile devices, utilizing the ability to make use of the geographical position of the mobile device.

Measure 69: On bus Traveller information in Aalborg. A parallel measure in the ARCHIMEDES project in Aalborg.

MitNT Measure 9: Modernising Travel information in Aalborg. A parallel measure in the ARCHIMEDES project in Aalborg.

NT: Public Transport Authority of North Denmark

NLive: web based RTPI system in NT designed for use in mobile phones.

RTPI: Real Time Passenger information system

PT: Public Transport.

VMS: variable Message Signs