

**CiViTAS**  
Cleaner and better transport in cities

**AALBORG**  
.....

## **Aalborg**

### T69.1 On-trip Bus Traveller Information in Aalborg

Aalborg Kommune  
November 2010



THE CIVITAS INITIATIVE  
IS CO-FINANCED BY THE  
EUROPEAN UNION

<b>Project no.</b>	TREN/FP7TR/218940 ARCHIMEDES
<b>Project Name</b>	ARCHIMEDES (Achieving Real Change with Innovative Transport Measure Demonstrating Energy Savings)
<b>Start date of the Project</b>	15/09/2008
<b>Duration:</b>	48 months
<b>Measure:</b>	69 On-trip Bus Traveller Information in Aalborg
<b>Task:</b>	Task 8.2 On-Trip Bus Traveller Information
<b>Deliverable:</b>	T69.1 On-trip Bus Traveller Information in Aalborg
<b>Due date of Deliverable:</b>	15 <sup>th</sup> October 2010
<b>Actual submission date:</b>	5 <sup>th</sup> November 2010
<b>Dissemination Level</b>	Public
<b>Organisation Responsible</b>	The city of Aalborg
<b>Author</b>	Anna Alice Wust
<b>Quality Control</b>	Alan Lewis
<b>Version</b>	1.01
<b>Date last updated</b>	2 <sup>nd</sup> November 2010

# Contents

1. Introduction .....	4
1.1 Background CIVITAS .....	4
1.2 Background ARCHIMEDES .....	5
1.3 Participant Cities .....	5
2. Aalborg .....	6
3. Background to the Deliverable .....	7
3.1 Summary Description of Task .....	7
4. On-trip Bus Traveller Information in Aalborg .....	7
4.1 Description of Work Done .....	7
4.1.1 Planning Phase .....	7
4.1.2 Implementation and Evaluation .....	9
4.2 Specification of On-trip Bus Traveller Information .....	9
4.3 Communication .....	13
4.4 Problems Identified .....	14
4.5 Future Plans .....	14
Annex 1. Abbreviations .....	15

# 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 then 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 priority is granted to public transport in Aalborg, delays do still occur and passengers still miss their connections. Uncertainty about departure times and possible problems in reliability prior to and on public transport trips are some of the barriers that can discourage potential passengers from using Public Transport. On-board information on delays and connections, and access to the same kind on information prior to entering the bus (via mobile phones ARCHIMEDES measure 68) is expected to lower these barriers and give the traveller “peace of mind”. Another benefit is that the system contributes to improving the image of public transport and thus helps public transport to appear as an attractive alternative.

In this measure, on-board information screens have been implemented on 100 city buses at Nordjyllands Trafikselskab (NT - Public Transport Authority of North Denmark). Information on the current journey (e.g. up-coming bus stops and overall destination) as well as information on connections and traffic information as changes in routes or cancellations will be shown. The information on the flat screens is based on NT's Real Time Passenger Information system (RTPI). The screens show information on the current trip as the destination for the trip and the three upcoming bus stops. News, weather forecasts and advertisements are shown in between as well as simultaneously with public transport information. In addition transfers and connection information will be shown in the next phase.

Of the 100 city buses, 50 buses operating in the CIVITAS corridor are financed with the support of ARCHIMEDES, whereas the remaining 50 city buses are financed by NT. The ARCHIMEDES project contributes to the purchase and installation of flat screens as well as the upgrading of the bus computer system to handle data for the flat screens.

This deliverable provides information about the implementation of task 8.2.

### 3.1 Summary Description of Task

The measure aims at installing and providing information on screens in 100 city buses in Aalborg. These information screens show information about the current trip with the upcoming bus stops and the overall trip destination as well as other services such as traffic information, news, weather forecast and advertisement.

## 4. On-trip Bus Traveller Information in Aalborg

### 4.1 Description of Work Done

#### 4.1.1 Planning Phase

The planning and pre-data collection phase started in winter 2008 with a working group consisting of the ARCHIMEDES' measure leader, two people from Nordjyllands Trafikselskab and a traffic planner from the Department for Sustainable Development of the City of Aalborg.

In 2009, NT initiated a pilot-project on one selected bus line to test the system and to gather user evaluations as input to the final system. The pilot project consisted of installation of software and two flat screens in each of 6 buses on the bus line starting in the end of June 2009.

After the pilot project, experiences with the user interface and the passengers' acceptance were collected with the help of a questionnaire that was conducted in November 2009 to which 368 people responded. The respondents showed a very positive attitude towards the information screens. Key results from this survey were as follow:

- 88% of the respondents liked the information screens.
- 87% of the respondents found it positive that news and advertisement were shown as a supplemental to the traffic information.
- 91% supported the method of providing traffic information on screens in buses.
- 90% thought that the information screens were a service improvement.
- Only 15% prefer announcements of the next bus stop via loudspeakers instead of the screens. (40% would prefer the information both via screen and loudspeakers, whereas 50% would like only to have the screen information.)

Combining on-screen announcement with loudspeaker announcements of central bus stops was consequently chosen as a solution to the dilemma of infrequent travelers – or elderly and disabled people - wanting this information and frequent users wishing to avoid this auditory disturbance.

In addition to evaluating the user interface, the pilot project provided experience in the operation of the screens, including the timing of passenger information and the combination with other types of information. Based on these experiences, specifications for the on-bus information system were incorporated into the tender for public transport in Aalborg. The new contracts become effective from end of June 2010 and by September 2010 the system was implemented on all 100 buses.

In the contract the responsibility for keeping the system running is shared between NT and the bus operators (Arriva and CityTrafik). The operators install and maintain the screens in the bus and are paid a dedicated amount for this. NT delivers the centralised and decentralised system which manages the content of the information.

An interface was created that allows RSS news to be read by the BusPc and integrated on the screens. Agreements were reached and contracts signed with the local media concerned with the delivery of a special bus RSS newsfeed consisting of the normal news feed tailored for use in the bus, where for example links are removed. The RSS feed is delivered once an hour to the buses via GPRS communication (data communication over a mobile phone network).

The commercials are delivered from an advertising company in the form of readymade JPGs, WMV or other standard file formats. Communication is over GPRS. All files are transferred during bus start-up and new files that are released during the day are transferred to the buses 'on the fly'.

### 4.1.2 Implementation and Evaluation

Installation of the two information screens in each of the 100 city buses was finished in September 2010. There are still a few minor software problems; however it is expected that all the information screens will be running without problems from the end of October 2010.

For the evaluation, a questionnaire will be conducted in November 2010. The questionnaire undertaken will be similar to the one that was conducted in 2009. The goal is to make a comparison to the first questionnaire to and evaluate if the changes made in the final system have further improved satisfaction with the user interface and the passengers' acceptance.

### 4.2 Specification of On-trip Bus Traveller Information

Information screens are installed in 100 city buses and on each bus there are two flat screens. The supplier uses the term 'infotainment' as a description for the screens that display information as well as entertainment. Infotainment is one part of a fully integrated information solution based on a central databases providing real time public transport information.

The screens are divided into three parts (figure 2).



**Figure 2. Contents model of bus screens**

- The top line shows the final destination and the present time.
- The middle part shows changing types of information.
  - One third traffic and general information from NT and the City of Aalborg (figures 3 and 4)
  - One third news and weather forecasts (figures 5 and 6)
  - One third public and commercial advertising (figure 7)
- The bottom part shows the next three bus stops.

No matter what is shown in the middle section of the screen, the final destination is always displayed on the top of the screen and the next 3 bus stops at the bottom.



Figure 3: Information display



Figure 4: Display of the destination and up-coming bus stops (Pilot project design)



Figure 5: News display



Figure 6: Weather forecast display



Figure 7: Advertisement display

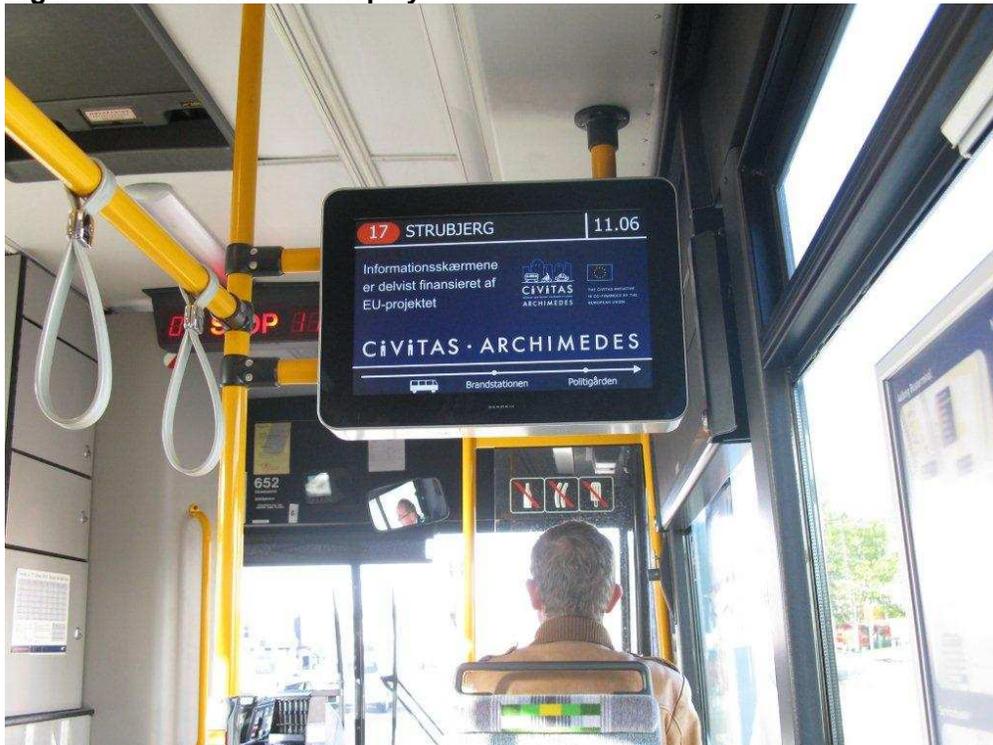


Figure 8: Splash screen: The information screens are partly financed by EU CIVITAS - ARCHIMEDES

### 4.3 Communication

In a press release NT announced that “all of Aalborg city, metro and service buses service will be equipped with information screens and real time passenger information” (NT press release, 22.1.2010).

The local radio channel (P4) brought a short story about the information screens in the buses (figure 9).



Figure 9: TV article from P4, 2. July 2010

The screens will also allow dissemination of different ARCHIMEDES measures. For instance the campaign movies on the “Take Me Home” mobile phone application will be launched in October 2009 (Measure 68).

In month 27 of the ARCHIMEDES project (November 2010) a SMS competition with riddles will run as a campaign on the screens to attract attention to the screens and in this way to disseminate the knowledge of the screens.

In addition, four large screens showing similar information have been set up in the waiting room of NT.

## 4.4 Problems Identified

The on-bus information system is an information channel whose prime function is to deliver existing Real Time Information on next bus stops etc. to the passengers. The success or failure of the system is therefore dependent on the reliability of the underlying RTPI system and the quality of the information in the system. As NT has a clear IT strategy for these matters and has been deliberately working on the data and IT infrastructure for some years, this has not been a problem in Aalborg. But attention has to pay to this issue.

Securing a satisfactory uptime for the system can be another challenge, especially in the technically demanding bus environment. A clear division of responsibility for the different parts of the system is a prerequisite for success. In Aalborg, NT is responsible for the busPc and the software where as the public transport operator is responsible for the uptime of the screens. This is a natural and sound division as it is the operator's employee, the driver, who is the first person to identify when the screens are not running.

As the system is an information system first, and a news and entertainment system second, it is important that the responsible organisation (the City or the Public Transport Authority), deliberately sets up the scheme so that information provision takes priority over news / entertainment. In Aalborg it was decided that the route destination and next stops should be shown all the time and that one third of the screen time should be reserved for traffic information.

During the project using sound on commercials and news was considered. It was decided to begin with a silent solution and to later test the impact of adding sound. In the meantime, experiences from a parallel system in the urban commuter rail system in Copenhagen have shown great discontent with the use of sound.

The final system became rather complex with a lot of parties involved (contractors, news providers, advertisement agencies, NT etc.). Therefore responsibility must be kept clear and internal and external interfaces must be open and simple. This requires a clear strategy and the willingness to simplify the system and keep traffic information the focus, if necessary.

## 4.5 Future Plans

To fulfil all the ambitions described in the ARCHIMEDES detailed project description more information on the real time information of crossing bus lines and exchange possibilities will be incorporated in the next versions of the software. The system will also be expanded with further information from local service providers such as Visit Aalborg, the Sportsarena etc. and with new types of (dynamic) information such as real-time information on train and flight connections to and from Aalborg being displayed on relevant bus lines.

Evaluation of the measure will take place according to the evaluation plan so results can be disseminated to other CIVITAS cities when FP7 has ended.

The demonstration system is expected to continue after the end of the ARCHIMEDES project.

## Annex 1. Abbreviations

### Abbreviations of technical terms in this report:

NT: Nordjyllands Trafikselskab - Public Transport Authority of North Denmark.

RTPI: Real Time Passenger Information

RSS newsfeed: Really Simple Syndication. A family of web feed formats used to publish frequently updated works, such as news, in a standardized XML format.

BusPc: In Scandinavia a commonly used abb. for a PC running the applications in bus. Also often described as an On Board Unit (OBU)

GPRS communication: General packet radio service. Packet formatted data communication over a mobile phone network.

JPG: Joint Photographic Experts Group. Commonly used method for compression of digital images.

WMV: Windows Media Video. Commonly used proprietary video compression format developed by Microsoft