Sustainable Accessibility Concepts

Harmonizing Transport

Work Package 4.2

GSA

Report "Green Sustainable Airports" Work Package 4.2 "Harmonizing Transport"

1 Introduction and Objectives

The needs of airport passengers differ significantly from the needs of other public transport users. Language is often an obstacle and finding the way to the hotel or getting the right ticket are challenges for air passengers arriving at Bremen airport from other countries. The aim of the partners VBN and ZVBN is to convince people to use environmentally friendly transport modes on their way to or from the airport and to increase passenger satisfaction.

Improving passenger information could be a main factor in reaching this aim. The partners have developed an integrated approach to passenger information giving information on public transport at the airport and delivering flight information through the media of public transport.

This document gives an overview of the project activities of VBN and ZVBN. At first we describe the information needs of passenger and the current state of information about public transport for airline passengers. The next chapters give an overview of the legal and technical framework for passenger information and we describe the solutions developed for Bremen airport during the project.
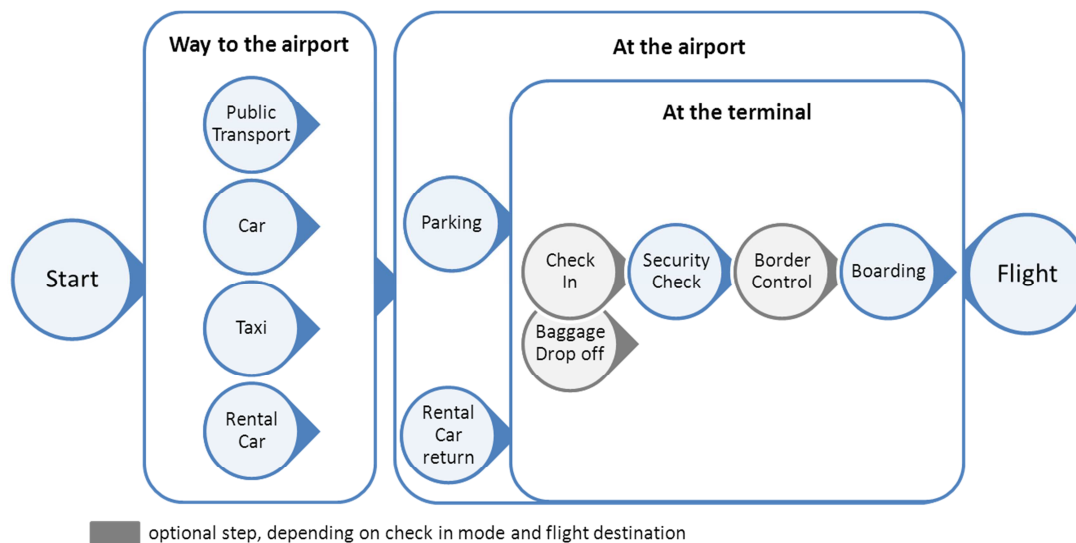
2 Passenger Information

2.1 Passenger Process

The passenger process differs, depending on whether the passenger is inbound or outbound and also on the means of transport the passenger uses to get to the airport or to get to his destination. Passengers can be divided into the following groups:

- passengers using a private car
- passengers using a rental car
- passengers using public transport
- passengers using a taxi

In this study we do not look at passengers who are taken to or picked up at the airport.

Picture 1: outbound passenger process
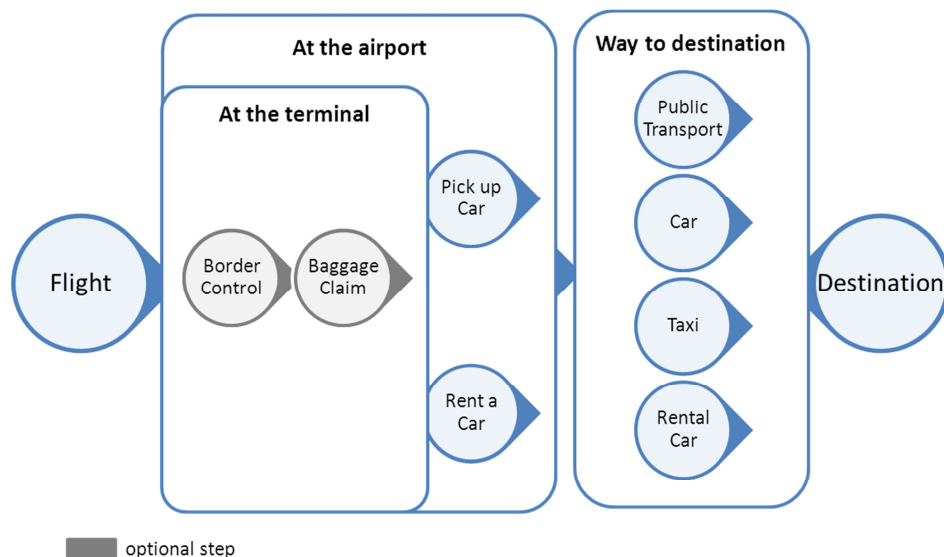
Picture 2: inbound passenger process

As shown above, the passenger process at an airport is rather complex and consists of many steps. Information systems should follow an integrated approach and give a full view of the whole departing or arriving process at an airport.

The informational needs of the passengers depend on the transport mode with which they leave or arrive at the airport.

2.2 Outbound Passenger Requirements

2.2.1 Information at Home

2.2.1.1 Planning the Trip

Here, the main question is: When does the passenger have to arrive at the airport? This time is determined by the following factors:

- When has the passenger to check in?
    - This time is determined by the airline or the airport.
- How long has the passenger to queue before check-in?
    - This question is normally very difficult to answer, especially for non-frequent travelers.
- Where will the passenger arrive at the airport and how long will it take to get from the arrival point to the check-in?
    - This time is determined by the route from the arrival point at the airport to the check-in:
        - from the parking lot

- from the drop-off point

- from the public transport station

- from the rental car returning point

- Which tasks does the passenger have to carry out and how long will these take?

  o parking the car

  o returning a rental car

  o finding a luggage cart

When the passenger has ascertained the arrival time, he has to determine the route to the airport and his start time.

Information Needs When Using Public Transport

The passenger has to acquaint himself with the following things when using public transport to travel to a flight:

- a complete itinerary with

  o means of transport

  o departure, arrival and change stations, and times

  o footpath from the start point to the departure station

  o footpath from the arrival station to check in

  o footpath when changing means of transport or at least the time the change takes

  o necessary tickets

2.2.1.2 Real Time Information before Starting the Trip

Once the trip is planned the passenger is interested in events which could interfere with his trip, for instance:

- public transport delays and cancellations on the planned route

- traffic jams on the way to the airport

2.2.2 Information en Route

When the passenger has started his trip, he needs to know:

- whether he is still in time or not
- if he his delayed, whether there are alternatives to get to the flight in time

This means for instance:

- when the passenger is using the railway and is delayed, he needs information on whether he can still use public transport or whether he should change to a taxi
- whether there is still a possibility to get to the airport in time if there is a traffic jam

2.2.3 Information at the Airport

Once the passenger has arrived at the airport he needs the following information:

- directions to the check-in
- directions from the check-in to the gate
- how long it will take to check in
- how long it will take to pass through the security check
- how much time it will take to walk

2.3 Inbound Passenger Requirements

2.3.1 Planning the Trip

The passenger decides about the means of transport based on the following criteria:

- reachability
- availability (is the transport available at arrival time?)
- price

To plan a trip with public transport it is necessary to have the following information:

- how much time it will take to walk from the gate to the station
- how long it will take to pick up luggage
- the frequency of public transport connections

- the kind of ticket necessary for the trip

- where the ticket can be bought

2.3.2 At the Airport

If the passenger is using public transport for his ongoing trip he is interested in the next departures reachable from the following points:

- starting at the gate (when traveling only with cabin baggage and no border control has to be passed)

- starting at the border control (when traveling only with cabin baggage)

- starting at the baggage claim

Every information display about public transport should show the next departure and the time to walk to the stop or station from the point the display is installed.

2.4 Requirements of the Airport Authority and Airlines

Informed passengers are more content. The value of this may be debatable but rather more concrete is the fact that:

- airlines have to avoid delays caused by passengers arriving late. Delays cost money.

- airports are interested in a fast and smooth passenger process. A passenger who completes the process quickly and is well informed about the next steps is more likely to spend time shopping.

# 3 Current State of Passenger Information on Public Transport

3.1 City Airport Bremen

3.1.1 VBN – Bremen/Lower Saxony Public Transport Association

There is no special information designed for airline passengers through VBN, but with the information system "Fahrplaner" it is possible to find a route from every start address to the airport or from the airport to every destination address in the city of Bremen and its surroundings. With the connection to the nationwide network of journey planners "DELFI" you can find door to door journey information for whole Germany. The English website gives basic information on the transport association and tariffs.

3.1.2 City Aiport Bremen – BRE

There are some information signs inside the terminals. Unfortunately they do not comprise a whole guidance system. They only give information on punctuality. Information on public transport and tickets are available at the central information desk at the hall.
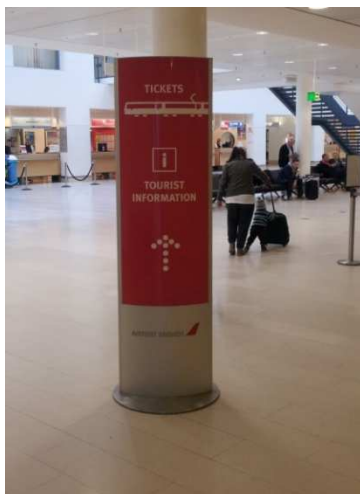
Picture 3: information sign in the passage between Terminal E and Terminal 2

There is a static text page on the airport website describing the possibilities to reach the airport via public transport. The text contains line number, frequency and duration of the trip to the city.

3.1.3 Airlines

We checked the information of the bigger airlines flying to and from Bremen airport.

The websites of Lufthansa, RyanAir and Air Berlin contain pages describing the possibilities to reach the airport by public transport. The information is plain static text and does not contain any links to a route planner. The following table gives an overview of the information delivered by the airline websites:

RyanAir	The website contains a page with sightseeing information about Bremen. A small textbox with public transport information is embedded and contains: • Advice about the location of the public transport station at the airport • number of tram line and frequency • duration of the trip to the city • ticket costs (not up-to-date)
Lufthansa	The airline website contains a page describing all transport modes to reach the airport. For public transport only the tram line is named.
Air Berlin	The airline website contains a page describing all transport modes to reach the airport. The following information is given for public transport: • number of tram line and frequency • duration of the trip to the city

The other airline websites checked (for instance Condor, Air France, Air Via) do not contain any traveler information for reaching the airport.

3.1.4   Bremer Straßenbahn AG (BSAG) – local public transport operator

The Bremer Straßenbahn AG is the main operator of local public transport in Bremen. It operates the tram line 6 from the airport to the city centre, central station and university. And additionally the bus line 52 which is a tangential bus line in the south of Bremen.

BSAG operates a dynamic departure information display situated in Terminal 2. This display shows the current departures to the city.

Picture 4: current dynamic passenger information in the arrivals hall

The display belongs to the first generation of dynamic passenger information from the 90s. So its life cycle comes to an end and it has to be replaced.

Additionally BSAG operates two information terminals in Terminal 2. Theses terminals are based on the journey planner system of BSAG and not the VBN. The software isn't up to date so it's planned to remove these terminals.

3.1.5 Traffic Management Centre (TMC)

The information delivered by the TMC can be found on the website of the city of Bremen. The website contains a static text page containing a description for all modes of transport to reach the airport. The following information points are given for public transport:

- location of the public transport stop at the airport
- line number
- frequency
- duration of a trip to the city center

3.1.6 Bremen Tourismus Zentrale – local tourism service center

The tourism service center delivers the same information as the TMC. Additionally they give the cost for a single ticket to use the public transport.

3.2 Other Examples of integrated passenger information
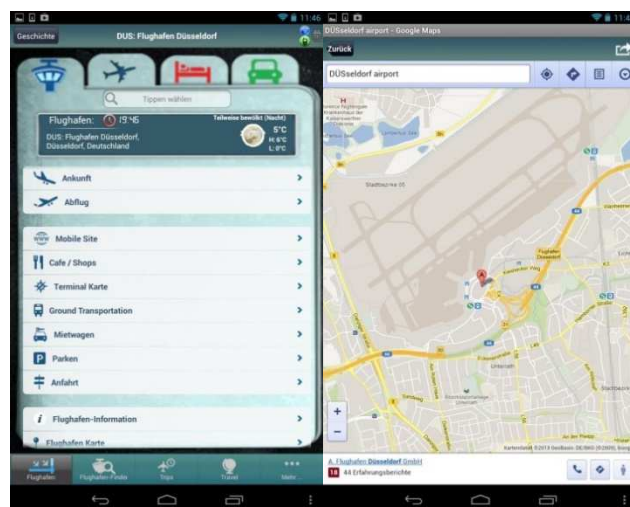
3.2.1 FlyToGet App

FlyToGet is an express train connecting Oslo with Oslo Airport. The mobile app FlyToGet delivers timetable information including real time information. Additionally, the app delivers a flight departure and a flight arrival table and text pages with general travel information.
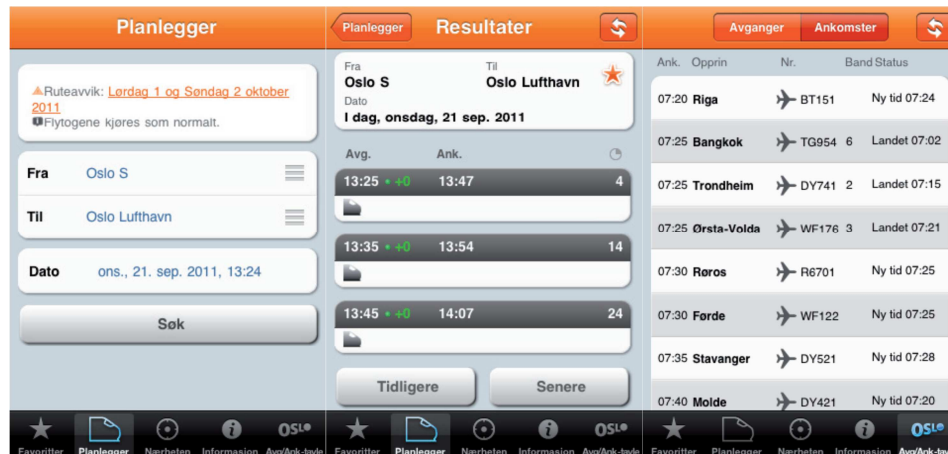
Picture 6: FlyToGet – app with timetable information for the express train and flight arrival/departure table

3.2.2 Other Airport Apps

Other airport apps normally contain a flight arrival/departure table, a textual description of the possibilities to reach the airport by public transport and a map showing the location of the airport including the public transport stop.

Picture 7: Düsseldorf Airport app

Picture 8: City Airport Bremen app

3.2.3   Other Airport Websites

Airport websites normally contain a textual description of the public transport. We found two other ways of informing passengers, on the websites of Billund Airport and Leipzig/Halle Airport.

Picture 9: Billund Airport website

The Billund Airport website contains the timetables in PDF form of all bus lines approaching the airport.

The Leipzig/Halle Airport website contains a form where the user can select a flight, a public transport stop and whether he will depart or arrive by the selected flight. By submitting the form the user is forwarded to the INSA timetable information system. The systems provides a public transport connection with a standard change time of 120 minutes from or to the flight.

Picture 10: form providing a front end for the INSA timetable information system at Leipzig/Halle Airport

3.3 Summary

The airport authorities and the public transport companies acknowledge the need to deliver integrated information on public transport to reach an airport. At the moment there is no real comprehensive solution which integrates flight timetable data, public timetable data and the passenger process at the airport to cover the whole passenger process.

The reason for the lack of this solution is mainly due to the complexity of the passenger process. This complexity makes it difficult to provide a full integration. However, as the VBN system shows with the solution developed in the project, there is the possibility to accomplish a "light" integration. This light integration does not deliver information on the whole process but the available information is easy to find.

4 Regulatory Framework

4.1 European Union Regulations

There are no mandatory regulations by the European Union relating to traveler information and traffic data exchange. This fact is mentioned in several studies and this project also recommends also regulation by the European Parliament.

There are some recommendations by the European Union. e.g. in Regulation 181/2011, concerning the rights of passengers in bus and coach transport, and amending Regulation (EC), it is recommended that the rights of passengers should include timetable information and information about accessibility.

4.1.1 Open Data

Open Data is an initiative of the European Union which promotes the sharing of data to make it available to people free of charge. This especially means public transport authorities' data and other enterprises funded by the public. The data should be made available without any cost or for a low charge.

Open Data promotes the development of new services by third party developers and it is very likely that many innovative services will result from Open Data.

Flightradar24 is an example of a service made possible through Open Data. The website collects the data provided by every aircraft through the ADS-B service. ADS-B is a service originating in air traffic control. Every aircraft which is equipped with an ADS-B transmitter sends regular signals containing information on position, flight direction, estimated time of arrival, etc. These signals are collected by ground receivers, often operated by private persons and delivered to FlightRadar24. FlightRadar24 is building up web services, mobile apps and other services, based on this data.

Open Data is also a part of the ITS action plan. This study concludes that sharing data with no or minimum cost will increase traffic safety and support the development of a multimodal European travel planner.

4.2 German Regulations

The public transport act PBefG regulates passenger information and the handling of timetable data. Paragraph §40 subparagraph 4 stipulates that a public transport company must share its timetable data electronically free of charge on demand of the responsible transport authority.

This is a basis for building up timetable information systems on public transport but currently there is no framework on which to build up an intermodal route planner and to exchange data between companies. This cooperation should be regulated by bilateral contracts.

4.3 Framework for Bilateral Data Delivery Contracts

According to FOPS report no 70.825 the following points describe a framework for bilateral data delivery contracts. Such a contract should contain the following paragraphs:

- Preamble
    - describing interests of both contract parties and the purpose of the agreement
- §1 Subject of the Contract
    - commitment to deliver data
    - deliver data and use it for traveler information systems
- § 2 Definition
    - data description
- § 3 Usage Rights
    - granting rights to use data for a special purpose
    - granting rights, limited in time, region or other reasons
    - list of rights granted
    - granting rights to third parties
    - limitation of commercial use
    - limitation of other usage
- § 4 Delivery / Cost
    - data delivery
    - data exchange media
    - interface description
    - technical requirements
    - frequency of data exchange
    - cost sharing of data exchange

- § 5 Quality Control
    - The data quality should be defined. Furthermore, both parties should agree on quality control actions and sanctions in the case of bad data quality

- § 6 Contract Penalty
    - agreement on contract penalty in the case of violation of contract

- § 7 Contract Duration
    - contract duration
    - cancellation
    - revocation of granted rights
    - data elimination at the end of the agreement

- § 8 Nondisclosure
    - as needed

- § 9 Liability
    - Agreement on liabilities according to the purpose

- § 10 Final Regulation
    - alteration of contract
    - supplements to an agreement
    - legal form
    - appendices
    - place of jurisdiction

5 Technical Framework

5.1 Public transport journey planner

5.1.1 Integration of Timetable Data

An integrated timetable data pool is the basis of a regional timetable information system. The following tasks are necessary for the building of such a data pool:

- build a station reference
- avoid double deliveries (recognize the delivery of the same line by different providers)
- unification of data attributes
- addition of missing attributes
- harmonization of timetable validity periods

The data pool used by VBN's "Fahrplaner" is integrated and provided by Connect Fahrplanauskunft GmbH. This company was founded by public transport companies and public authorities to generate and provide an integrated timetable data pool for the region Niedersachsen/Bremen. Currently, Connect provides the data pool to about 10 different timetable information systems, including data for all regional public transport companies and also for long distance transport operated by Deutsche Bahn.

5.1.2 Integration of real-time data from public transport

VBN has introduced real time in their journey planner in 2011. The system is based on the data exchange between the different transport operators (rail, tram and bus) in Bremen. To bundle and harmonize the information from the different transport operators a central data exchange platform collects the data, check the validity and sends the data to different data consumers. Data consumers are the different journey planners, dynamic passenger information displays. The platform exchanges also data between different public transport operators for the assurance of connections.

Main platform to inform passengers is the journey planner "Fahrplaner" which is based on the HAFAS system made by Hacon GmbH, Hannover Germany. The journey planner delivers information via the following channels:

- the VBN website www.vbn.de
- Mobile website m.vbn.de

- Mobile Application for the platforms IPhone, Android , Windows Phone and Java and for different devices (Smartphone and tablet)

- Station boards applications (described later)

- It's planned to access this data also via an xml-interface so that results from the journey can easily implement into other application (for example mobile airport applications)
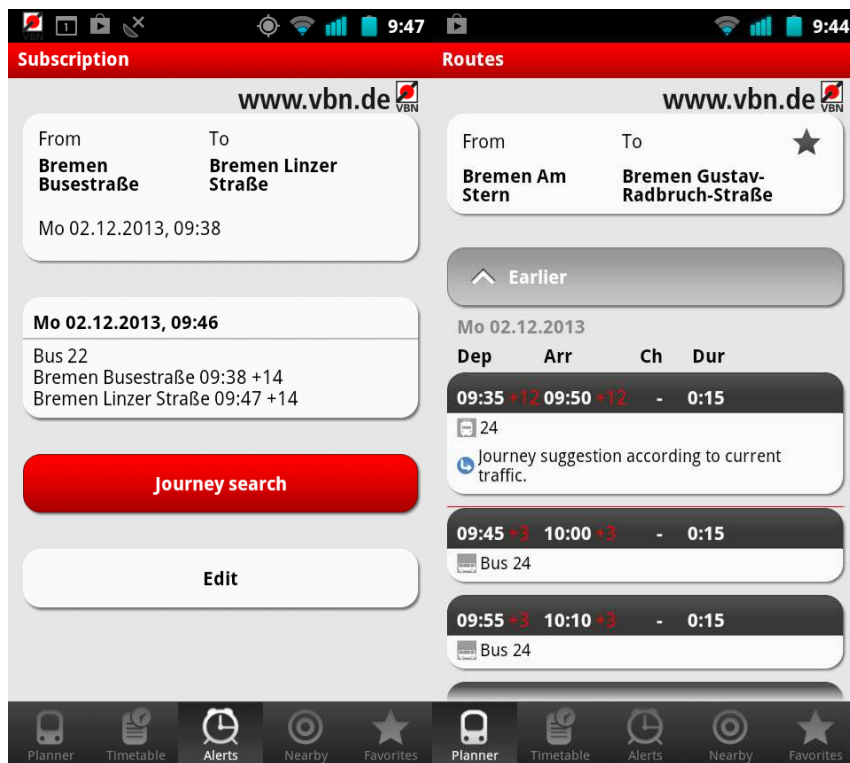
Picture 11: screenshots from the mobile application "Fahrplaner"

Especially with the mobile version of the Fahrplaner VBN has introduced several new functions which makes travelling with public transport more comfortable. First of all the push notification allow passenger to subscribe a connection. So in case of a delay of more than 5 minutes or if the connection is in danger, passenger get a notification about the disturbance of their connection. Based on real time information the system can calculate alternative routes. So if a track is closed passenger e.g. get a journey plan where they have to use the bus. The message are sent via the notification service of the related mobile operating system (Android, IOS, Windwos Phone). So compared to SMS based systems the service is cost saving for the operator.

5.2 Integrating Flight Timetables into Public Transport Timetable Information Systems

Different factors need to be considered when integrating flight timetable data into public transport data pools:

- A change between public transport and a flight is not a simple footway but a whole process. A change in public transport can be described as a time period, but this is not always sufficient for the complex process of check-in, security check and border control when taking a flight. If only one period is used to describe the change, the connections will not be optimal. The period of time necessary for a change must be differentiated to find the optimal connection.

- Time zones.

- Longer distances.

5.2.1 Real Time Flight Data

Flight data is delivered by the central flow management unit (CFMU) of EUROCONTROL. Ground control at the airport receives the data and provides it to the airport control system. This system provides the data to different services at the airport and to the exchange interface.

Flight data is planned according to the following periods:

- winter/summer flight schedule

- weekly flight schedule

- daily flight schedule

Once the departure time of a flight is defined, the estimated time of arrival (ETA) is calculated. This calculation is executed as a task of the flight planning process. The calculation of the ETA considers the following influences: weather, wind, weight of the plane, amount of fuel, airspace rights, etc.

The accuracy of this estimation depends on the planning procedure and varies from airline to airline. Furthermore, the ETA is updated during the flight according to unforeseen events.

5.2.2 Interface for Exchanging Real Time Data

The interface is based on FTP. The real time server periodically delivers a CSV file, which is read by the timetable information server.

The interface is implemented as a simple CSV file. Every line represents one flight. One line consists of the following columns:

Column title	Description	Contents and (example)
AD	Arrival or departure	contains an (A) if the flight is arriving or a (D) if the flight is departing
FN	Flight number	published flight number (LH 1234)
Date	Date	Date of arrival or departure (13.09.2013)
ST	Scheduled time	(06:00) scheduled time of arrival or departure
ET	Estimated time	(06:23) estimated real time of arrival or departure
Airport	Name of the airport	Flight origin or destination (AMSTERDAM)
Via	Name of a stopover airport	
Term	Terminal	(1)
Remark		

Example:

AD	FN	Datum	ST	ET	Flughafen	Via	Term	Bemerkung
A	LH 034	16.09.2013	07:25	07:16	FRANKFURT			07:19 gelandet
A	FR 3632	16.09.2013	08:25	08:12	LONDON-STN			08:15 gelandet
A	LH 2106	16.09.2013	08:05	08:15	MUENCHEN			08:17 gelandet
D	LH 037	16.09.2013	08:00		FRANKFURT		3	08:17 gestartet
D	LH 2107	16.09.2013	08:45		MUENCHEN		3	startet
A	4U 2030	16.09.2013	08:50	08:55	STUTTGART			im Anflug

5.2.3 Issues Integrating Real Time Flight Data

The study 'Costumer perceptions and behavioural responses to IT-based public transport information.'[4] concludes that real time information gives the passenger a feeling of confidence and security. Following this conclusion it is important for transport authorities to provide real time data, keeping the passenger updated on his travel process and therefore providing him with a degree of assurance.

A further important factor in the provision of real time data is the transport authorities' expectations with regard to how passengers use this data.

In public transport real time data is used to give the traveler more planning options or to choose a different route if the original route is interrupted due to delays or cancellations.

Getting the same information on every information channel is important to build up the customer confidence in real time data. Inconsistent information should be avoided.

There were many different estimated arrival times given for the same flight, when the different flight information channels were analyzed. For this reason it was decided to use only the flight data also given at the airport to provide in the public transport applications.

Additionally only a pull service was realized. An information, which requires a user interaction, are evaluated more thoroughly by the user. The user will assess this information according to his own experiences and given rules and decides on his further actions

In contrast a push service is more binding and requests action. The user will evaluate this information differently and will rely more on them. That is the main reason, why push services demand a much higher data quality.

5.2.4 Using Real Time Flight Data in Public Transport Information Systems

Real time flight data is used for implementing the features below in the "Fahrplaner" timetable information system:

- departure and arrival table
- international version of the routing system including flights
- airport widget to give the passenger a comprehensive view of all information relating to airport and public transport

	Abfluege		Ankuenfte

Flug-Nr.	Nach	Via	Abflug	Erwartet	Terminal	Status
			▸ früher			
FR 5216	MAILAND-BGY		11:55		3	12:13 gestartet
LH 2111	MUENCHEN		12:55		3	
FR 3782	MALLORCA		13:00		3	
TK 1332	ISTANBUL		14:30		3	
LH 041	FRANKFURT		14:35		3	
KL 1756	AMSTERDAM		14:55		1	
AF 1425	PARIS-CDG		15:15		1	
FR 9057	ALICANTE		15:20		3	
FR 3944	MALLORCA		16:20		3	
4U 2033	STUTTGART		17:05		3	
LH 2113	MUENCHEN		17:20		3	
AF 1525	PARIS-CDG		18:00		1	
KL 1758	AMSTERDAM		18:10		1	
AB 3402	MALLORCA		18:10		3	
LH 043	FRANKFURT		18:20		3	
XQ 985	IZMIR		18:50		1	
LH 2115	MUENCHEN		19:00		3	
FR 3612	OSLO-TORP		19:10		3	
4U 2035	STUTTGART		20:20		3	
LH 2117	MUENCHEN		21:15		3	
FR 3633	LONDON-STN		21:45		3	
			▸ später			

Picture 12: display of a simple airport departure and arrival table

⌄	Bremen Hauptbahnhof ⓘ	ab 16:46 +2'	0:16	0	🚊 Str 6	EinzelTicket: 2,40 €
	Bremen Flughafen ⓘ	an 17:02 +3'				Kinder-EinzelTicket: 1,20 €

Details	Zwischenhalte	Preis	Karte	Textansicht	Abflüge	Ankünfte

	Abfluege					

Flug-Nr.	Nach	Via	Abflug	Erwartet	Terminal	Status
			▸ früher			
FR 3782	MALLORCA		16:40		3	16:51 gestartet
4U 2033	STUTTGART		17:05		3	
LH 2113	MUENCHEN		17:20		3	
AF 1525	PARIS-CDG		18:00		3	
KL 1758	AMSTERDAM		18:10		3	
LH 043	FRANKFURT		18:20		3	
LH 2115	MUENCHEN		19:00		3	
BGA3TC	TOULOUSE		18:25	19:25		verspaetet
LH 045	FRANKFURT		19:50		3	
			▸ später			

Picture 13: display a flight departure table in the result of a route enquiry with destination airport

Ergebnisse

Bahnhof / Haltestelle	Zeit	Dauer	Umst.	Verkehrsmittel

Freitag, 07.06.13

	Bahnhof / Haltestelle	Zeit	Dauer	Umst.	Verkehrsmittel
⌄	Bremen Hauptbahnhof ℹ️ Copenhagen (Kastrup Airport)	ab 11:42 an 14:05	2:28	1	🚶 🚌 Bus TXL 🚶 ✈️ AB 8090

Details	Zwischenhalte	Karte	Textansicht

ab	11:46	+0'	Bremen Hauptbahnhof ℹ️		Gleis F

	📱	▶Str 6	Richtung: Flughafen Niederflurfahrzeug, Linie der Bremer Straßenbahn AG (BSAG), Info: 0421 59 60 59 Verkehrsinformationen zu dieser Linie finden Sie ▶hier verkehrt alle 5 - 10 Minuten.

an	12:02	+0'	Bremen Flughafen ℹ️

	🚶	Übergang	ca. 60 Min. **Bitte beachten: Zeiten für den Fußweg samt Ein- bzw Auscheckdauer sind nur Richtwerte! Maßgeblich sind die Fristen, die Ihnen der Veranstalter nennt!** **Terminal** 3

ab	13:05	Bremen Flughafen ℹ️

	✈️	AB 8090	Boeing 737-700 Passenger **Erwartet** 19:25 **Status** verspaetet

an	14:05	Copenhagen (Kastrup Airport)

▶Druckansicht

Picture 14: display of real time flight information in the international intermodal version of "Fahrplaner"
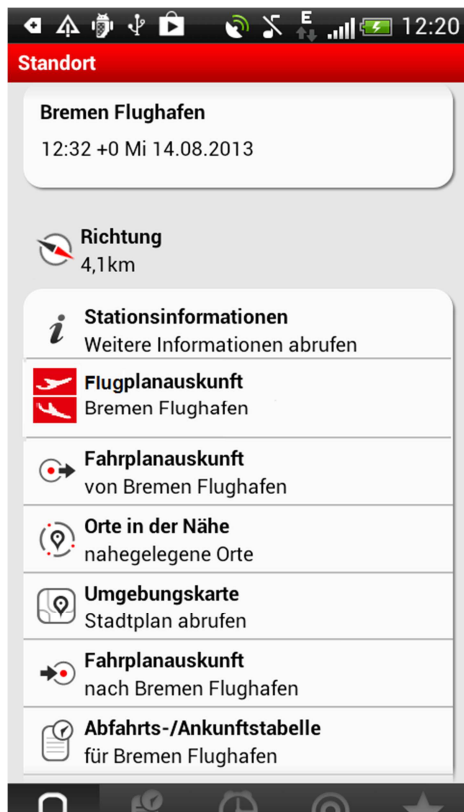
Picture 15: implementation of the previous feature in the mobile app

AKTUELLE ABFLÜGE

Abfluege

Flug-Nr.	Nach	Via	Abflug	Erwartet	Terminal	Status
			▶ früher			
FR 3782	MALLORCA		16:40		3	16:51 gestartet
4U 2033	STUTTGART		17:05		3	
LH 2113	MUENCHEN		17:20		3	
AF 1525	PARIS-CDG		18:00		3	
KL 1758	AMSTERDAM		18:10		3	
LH 043	FRANKFURT		18:20		3	
LH 2115	MUENCHEN		19:00		3	
BGA3TC	TOULOUSE		18:25	19:25		verspaetet
LH 045	FRANKFURT		19:50		3	
			▶ später			

AKTUELLE ANKÜNFTE

BAHNSTEIGE

AM BAHNSTEIG VORHANDEN

3 Bahnsteigkanten		2 Bahnsteige	
Barrierefrei erreichbar	Züge barrierefrei nutzbar	Blindenleitsystem vorhanden	Wetterschutz vorhanden
Überdachte Sitzplätze	Nahrungsmittelautomat		

VERKNÜPFUNGEN

Picture 16: a comprehensive overview of all important passenger information

6 Information Displays

6.1 Tech Solution

The information displays are web-based. The key elements of the architecture are:

- a server with the software to configure and generate the html-based web page
- a simple network PC to display the web page

The web page to display is configured on the server. The configuration is stored in a file saved on the server. A shortcut URL is generated at the end of the configuration process. This URL is transferred to the network PC. A simple web browser in full screen mode is used to display the page. A simple script refreshes the script regularly.

The whole system should be able to be remotely controlled by VBN so the network PC will connect to the Internet via UMTS/LTE. This is the easiest way to avoid all firewall or VPN issues which would occur if the network PC used the airport network.

The displays are equipped with a Slot-in PC with a Windows 7 embedded operating system. This technique secures an easy to maintain system. Also this integrated solution only uses a small space and can be installed with one installation for the display.

Verkehrsverbund
Bremen/Niedersachsen
VBN

Sie bearbeiten: BremenFlug_691200_1834770796

| Speichern | Änderungen übernehmen und zur Übersicht | Speichern+Vorschau | Keine Änderungen | Löschen | Übersicht |

Ihre Angaben (Haltestelle, Datum, Uhrzeit)

Bhf./Haltest. Bremen Flughafen Anzeigename:

Darstellung in Übersicht

Äquivalente Haltestellen
1. ☑ Bremen Flughafen Anzeigename Bremen Flughafen ∧ Äquivalente Haltestellen zurücksetzen
2. ☑ Bremen Flughafen Anzeigename Bremen Flughafen
3. ☑ Bremen Flughafen Anzeigename Bremen Flughafen ∨

Datum ⦿ Nur Fahrten für heute ○ Alle Fahrten vom 14.10.13 bis 14.12.13

Typ ⦿ Abfahrt ○ Ankunft

Format ⦿ html ○ xml

Filter & Produkte (Richtung, Fahrten und Linien)

Richtung

Zusatztext Durchfahrt[1]: Zusatztext:
Durchfahrt[1]: Zusatztext:
[1]Haltestellennamen müssen korrekt geschrieben sein

Züge/Linien nur angegebene Fahrten darstellen Filter hinzufügen 🗑

Produkte
☑ ICE ☑ IC/EC ☑ IR/D ☑ IRE/RB/RE ☑ S ☑ Bus ☑ Schiff ☑ U ☑ Tram ☑ AST
| Alle auswählen | Alle abwählen | Nur Züge | Nur Busse |

Optionen

Anzahl Zwischenhalte 0 Vorlaufzeit 0 [Minuten]

Anzahl angezeigte Fahrten (to display) 10 Mindestrestfahrzeit 5 [Minuten]

Anzeige ab Fahrt 1

Betriebsart Realtime (Aktualisierung jede Minute)

Layout (Überschriften usw.)

Picture 17 Configuration interface for the Departure table

6.2 Showing Public Transport Information at the Airport

6.2.1 Content

15:32	Abfahrten Richtung City / Hbf / Huchting / Kattenturm			Abfahrten ab Bremen Hbf			
Departures to City / main station				**Departures from Bremen Main Station**			
Abfahrt in Minuten	Fahrt / service	Richtung / direction		Abfahrt in Minuten	Fahrt / service	Richtung / direction	Gleis / platform
5	🚋 Tram 6	Universität *via Hbf / main station*		21	🚆 IC 2038	Emden(Ostfriesl) Hbf	3
8	🚌 Bus 52	Kattenturm		24	🚆 RE 4420	Bremerhaven-Lehe	7
11	🚋 Tram 6	Universität *via Hbf / main station*		25	🚆 NWB RS1	Verden(Aller)	5
14	🚌 Bus 52	Huchting		28	🚆 ME 81923	Hamburg Hbf	10
17	🚋 Tram 6	Universität *via Hbf / main station*		32	🚆 NWB RS1	Bremen-Vegesack	5
23	🚋 Tram 6	Universität *via Hbf / main station*		35	🚆 RE 4471	Osnabrück Hbf	8 Süd
29	🚋 Tram 6	Universität *via Hbf / main station*		37	🚆 IC 2433	Leipzig Hbf	1
ng normally! Alle Verkehrsmittel vekehren planmässig! All services are operating normally! Alle Verkehrsmittel vekehren plan Test Test1				38	🚆 NWB RS4	Nordenham	2 Nord

Picture 18: display with public transport Information (departure table)

There is only one public transport stop at Bremen airport so the displays show a simple list of departures. Every line contains the following fields:

- planned departure time
- expected delay
- name of the line
- direction of the line

On the second half of the screen the departure of regional and long distance trains at the central station will be shown. This includes an offset of 20 minutes so passenger can get the trains at the station.

6.2.2 Positioning

The displays are placed along the footway from the gate to the departure station at the airport. Every display gives the passenger information on which bus or tram he can catch and how long it will take to walk from the display to the station. This enables the passenger to determine at what pace he will proceed to the station.

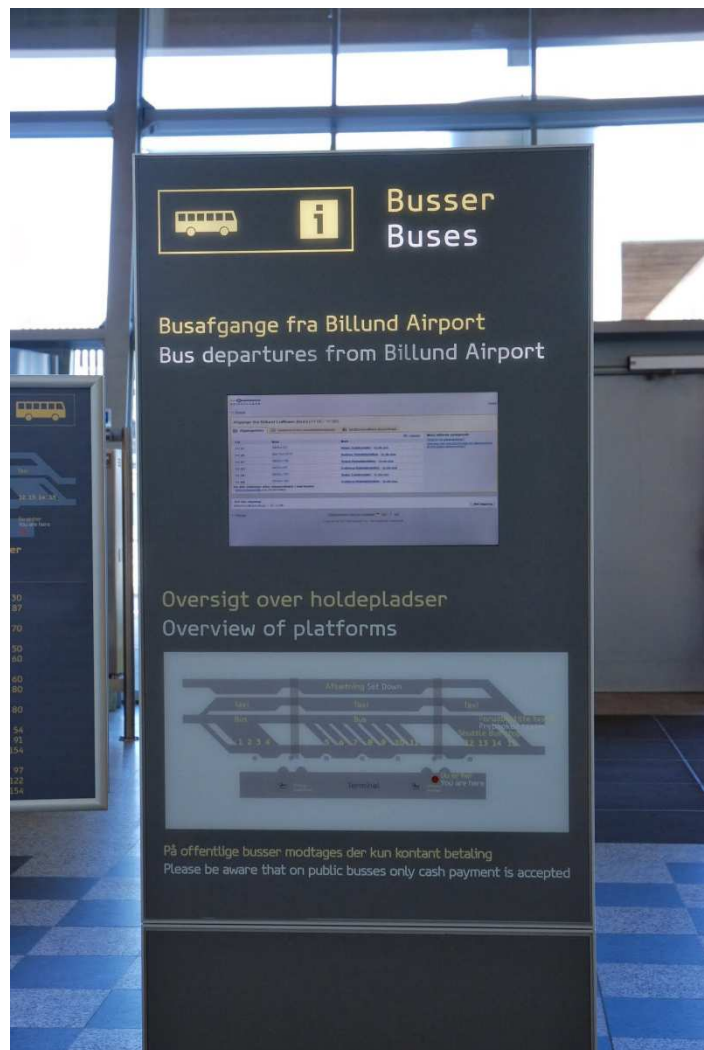Technical criteria for the positioning include:

- availability of a power line

- visibility of the display
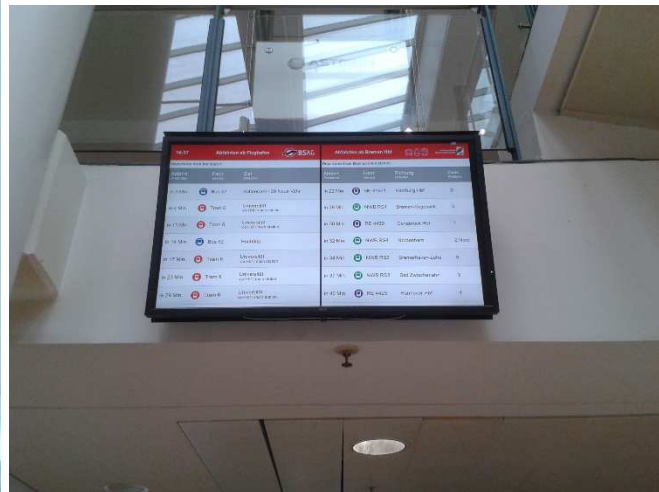
Picture 19: locations where the public transport information display in terminal 2is installed

Picture 20: location to install the public transport display in BRE Terminal E

Picture 21: information display with passenger information at Billund airport

7 European Prospects in Data Exchange

7.1 Multi modal journey planner

EU policies foster the development of multimodal journey planners. The provision of EU-wide multimodal travel information services is a high priority of the ITS Directive 2010/40/EU (priority action (a)) and the subsequent ITS action plan from 2011. [1],[2]

The European Union encourages the development of door-to-door journey planners which includes the possibility to purchase the tickets for the planned trip. The main issues in developing such systems are the accessibility and availability of traffic data for different service providers and the development of a standard exchange data process.

7.2 New data formats

Open data initiatives have already shown success. More and more public transport operators publish their data as Open Data in the General Transit Feed Specification (GTFS). The use of a standardized format for many transport regions opens new options for multimodal transport planners. It makes it technically much easier to combine the data and integrate other transport modes like air transport.

Also publishing data as open data makes it much more interesting to integrate data for data provider like Nokia/Navtech, TomTom/Teleatlas or Google. These companies needn't care about of signing contracts with hundreds of transport operators. This integration opens new markets like car navigation systems or the integration into the native mobile map application. The integration of airport data will be the next step.

8 References

[1]   Tom van de Ven, Mark Wedlock RappTrans. (2011). *IST ACTION PLAN 8 –*
        FINAL REPORT. Brussels.
        (http://eur-
        lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010L0040:EN:HTML).

[2]   Peter Rapp, Rémi Tempier RappTrans. (2011). *IST ACTION PLAN D4 –*
        STAKEHOLDER VIEW. Brussels.
        (http://ec.europa.eu/transport/themes/its/consultations/doc/2011_05_27-
        multimodal-journey-planner-results.pdf)

[3]   Rhein-Main-Verkehrsverbund Servicegesellschaft mbh. (2010).
        Forschungsbericht FE-Nr. 70.825 Eigentums- und Nutzungsrechte im
        Öffentlichen Verkehr. Frankfurt: Bundesministerium für Verkehrs, Bau und
        Stadtentwicklung.

[4]   DZIEKAN, KATRIN. (2004). Costumer perceptions and behavioural responses
        to IT-based public transport information. Stockholm. KTH Infrastructure,
        Division of Transportation and Logistics, KTH Royal Institute of Technology,
        Stockholm 2004