

Specifications for Bluetooth-Hotspots

How should the bluetooth-hotspots be designed? What should they be able to achieve?

In the course of researching the most suitable bluetooth technology for the Smart Cities Project various factors were taken into account. During the investigation and selection of the hardware, special consideration was taken in respect to quality and workmanship for use in info-terminals, which can be placed indoors as well as outdoors in Bremerhaven.

Functionality, but also possibilities and probable limitations of the bluetooth communication protocols for contents on mobile devices and producers were investigated and evaluated.

With this, the requirements were clearly defined. The determined requirement matrix was the basis for the product specification. The next step was the tender invitation for the bluetooth hardware. As a result of the complex requirements resp. precise production specifications only a few suppliers came into question.

For economic reasons only a few suppliers came into consideration for the delivery of the required technology. In some cases, the reaction of the suppliers to answer to the special tender request, including all technical inquiries, took up to two months. Towards the end the selection of suppliers was reduced to only three suppliers, who came into consideration. With this three concrete proposals were presented to the Smart Cities Project group.

As a result of the subsequent evaluation through the project group the supplier with the most convincing offer in respect to technical and economic aspects was invited to Bremerhaven for a test presentation on April 15, 2010. The main focus of the presentation was on the hardware and interface. In addition open questions and issues regarding cost calculation were cleared.

The presentation of the company HiWave showed the hardware possibilities as well as the possible spectrum of services. HiWave also displayed the possible service scenarios in the interface of the test-box to the project group. This included, aside from the transmission of text and pictures (city map) also an audio- and video-transmission.

After the presentation the test box and the corresponding equipment was left with the Smart Cities Project group for further internal testing and presentations. Next, the application was presented to the project director, Jochem Schöttler, from the Bremerhaven Tourist Board. Together with the project manager, Franziska Stenzel, after the presentation and discussion about the next procedures, the binding award of contract was given to the supplier.



Mid May Hiwave delivered the bluetooth boxes to the i-ventions GmbH. During the following two weeks, the boxes were hooked up to the „testbed“ for the hardware elements and the Info-

terminals by the employees of i-ventions GmbH. The main functions and operating requirements for the installment in the in- and outdoor terminals were checked and prepared. The bluetooth hardware was given to the terminal administrator for installation preparation only after the quality-check.

In the second and third week of June, the first installment and connection of the bluetooth hardware to the info terminals will take place. A new content management system will be integrated for this in order to control the management of the contents on the info terminals from the administrator as well as to amend the control elements for the bluetooth hotspots at the respective locations. Parallel to this the start pages of the info terminals will be re-launched in order to improve user friendliness while searching for offered services.

Implementation of Bluetooth-Hotspots

1. As „Location Based Services“ in Info-Terminals

For the installation of the bluetooth-hotspots as well as the services connected to them, the carrier medium of the „info-terminals“ must be accordingly prepared. This entails aside from the installation of the bluetooth hardware also the identification of the info-terminals as a bluetooth-hotspot by means of a label, which can be seen from a distance, as well as the implementation of the „general user interface“ (GUI) for the bluetooth service.

Against this backdrop, the starting page of the info-terminals must be developed to integrate not only the general and already existing services but also the new bluetooth services. This service must be easy to access and user-friendly.

Thus we are talking about the buttons resp. action-areas on the starting page, which contain the respective selection and control elements for the bluetooth content and provide the interested user with a selection.

This functional process contains aside from the selection buttons on the start page, respective submenus for the selection of the bluetooth services at the location of the info-terminals (Location Based Services). This means, bluetooth services, which orientate themselves to the specific environment (e.g. audio file for the location, etc.) combined with general information about the region or entertaining and informative services (pictures, music, etc.).

The existing content management system must be extensively expanded and revised for integration directly into the start and selection mask construction of the existing and new info-terminals in Bremerhaven and region. In this way we will be able to comply with the new requirements through the bluetooth services and should the situation later arise with the expansion of service scenarios.

The first step for this will be to give the starting page of the info-terminal a new layout and at the same time align it with the city website www.bremerhaven.de (relaunch July 2009) in order to present visitors with a unified website display.

The second step will be to reorganize the total structure of the terminal starting page. In addition to the selection menu on the left and the centrally located info and action areas, a central area for „e-services“ will be added on the right side of the starting page of the terminals. In this area the bluetooth services and other e-services (e-card, online-tickets, e-city map etc.) will be highlighted with



a distinct and clear button structure. With this the meaning of the „e-services“ will be clearly accentuated for the terminal user as „location based services“.

The work related to realization of the new starting page layout, the complete overhaul of the content management system administration, including the necessary templates and implementations on the first prototype will probably be completed by mid July 2010.

Parallel to this a questionnaire is being developed on user and handling friendliness in order to test the implementation and if necessary to make modifications. Data collection and results of the survey will be available probably by the end of September.

2. Implementation of the new Info-Terminal Start Page

The development of the new content-management-system (CMS) for the info-terminals was centrally conducted on the server of the terminal-control-system, which is responsible for the controlling and remote maintenance of all terminals.

The new surface layout of the info-terminals was cut and implemented as a HTML-skeleton: left-sided main navigation, info-area in the middle with main and sub-elements as well as a right-sided navigation area, which includes all e-services of the info-terminals in a clear and easy to use design.

In addition further basic functions, such as bilingualism (German/English), search and news ticker were included.

The user friendly CMS allows for easy duplication of an already designed basic page and a quick and easy adaptation for another terminal location. Another applicability is the differentiation between the preview version with the current adaptations and the published version on the live-system info-terminal.

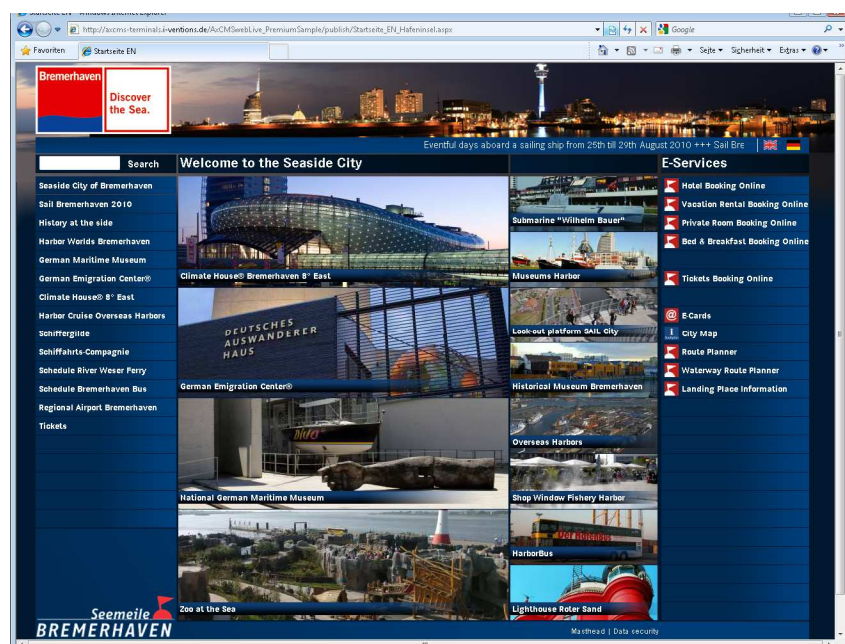
For later click- and usability-statistics a respective code is included in the pages for heatmap-analysis.

The implementation of the first info-terminal „Hafeninsel“ directly in front of the main tourist-info in Bremerhaven additionally required a setup in the web-based terminal-control-system, which is used for the remote control and remote maintenance.

Besides the "new" location-independent start page link, the implementation also includes for example global filter settings for linking together permitted domains and depending on the location also additional individual filters for permitted internet pages.

The last step for implementing the start page contains an up date of the individual info-terminal PCs. Through the new application among others expansion features were necessary. These were installed and activated (e.g. current flash-player), in order to comply with the current display standards of multimedia-elements through the browser on the terminal computers.

At the moment we are working on the following pages of the bluetooth applications in the e-services area. After an internal test phase these pages will be put online in approx. two weeks.



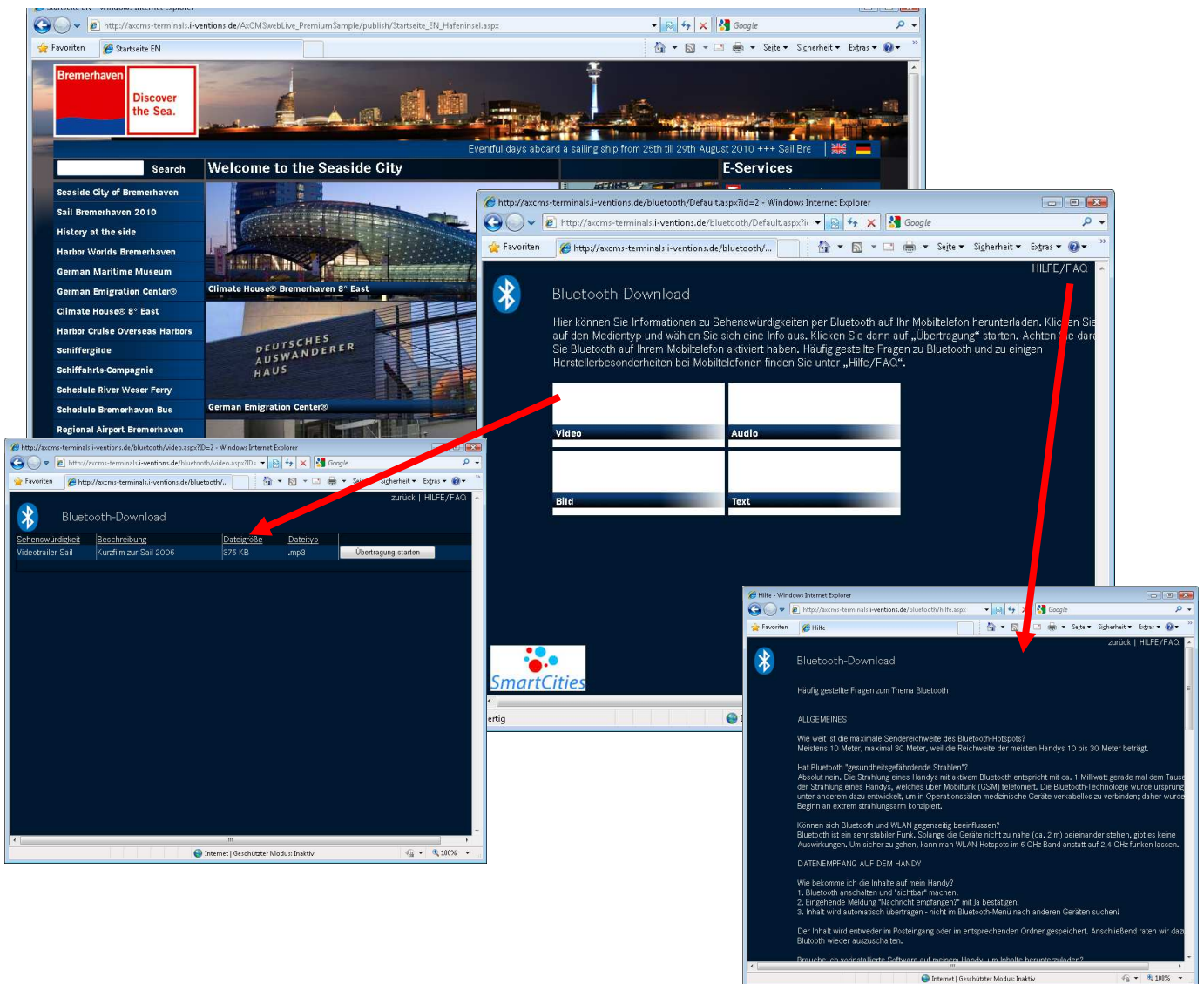
3. Implementation of the Following Pages for the Bluetooth-Service on the Info-Terminals

In the meantime all 23 info terminals are equipped with the new layout and show the listed e-services clearly and well structured on the right-hand side.

It is now possible to call the bluetooth-services available at that location using the right-sided menu „e-services“ on the info-terminal pages. (until now implementation on one test-terminal).

On the overview page for bluetooth-downloads the respective available categories (video, audio, text, picture) will automatically be displayed, however only if contents in that category are available at that location. In addition the user also receives a short note on the overview page, how he can load the contents onto his mobile device. One click on the respective category (video, audio, text, picture) opens a new window, which shows an overview of the available contents in the respective category, which can be downloaded. The display of the file size and type gives the user an idea on the download time. One click on the button „start download“ activates the transmission of the bluetooth-download for the reception onto the mobile device.

The user can obtain more detailed information using the button HELP/FAQ. Here data reception onto mobile devices, special cases, security and other aspects, which are connected to the bluetooth-download are described in more detail.



Furthermore the code necessary for the heatmap-analysis has been integrated onto all html-pages, so that a first analysis will shortly be possible. The results of the heatmap-analysis will deliver, among other things, information on user behavior as well as on possible superfluous menu items.

4. Allocation of location related contents for the bluetooth services

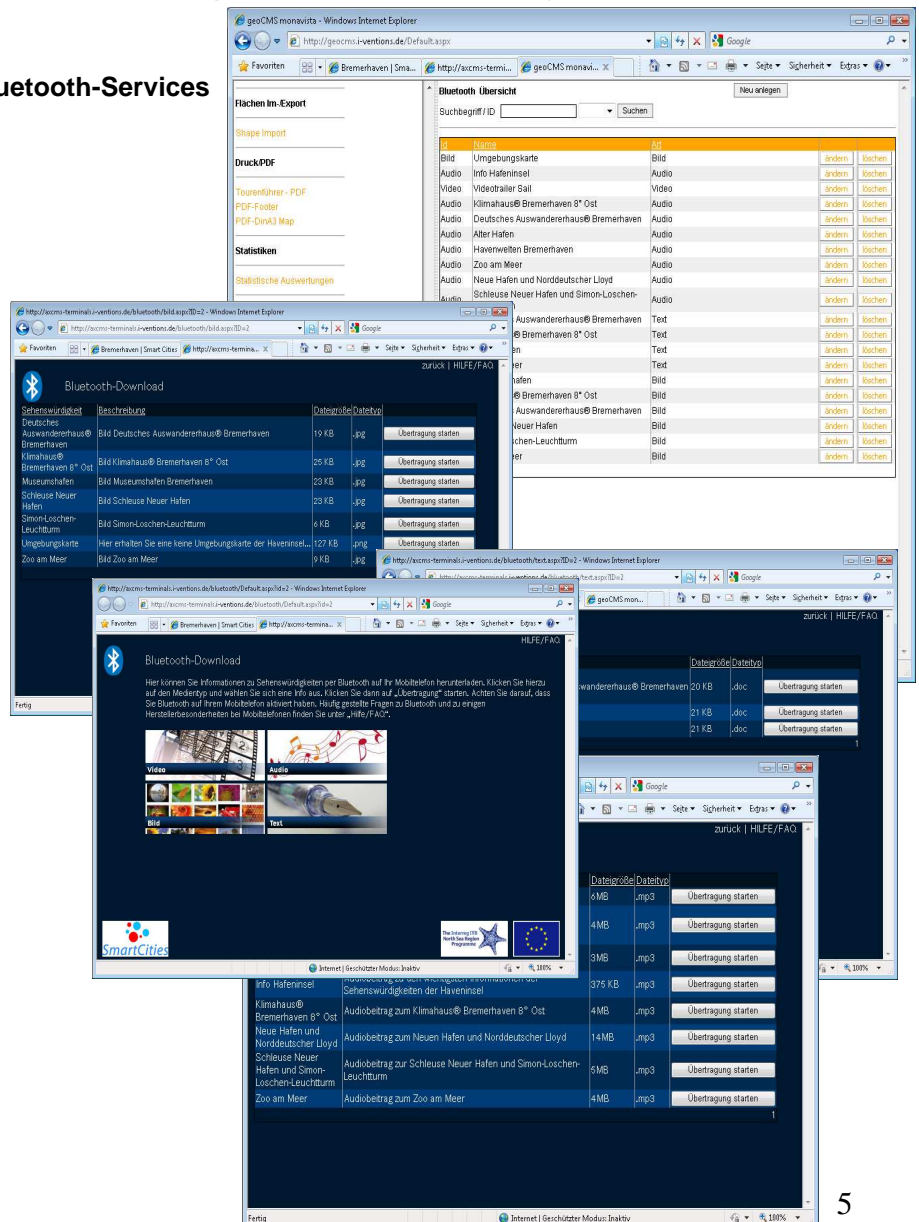
After the implementation, completion and testing of the process chain of the bluetooth services, from data uploads to bluetooth downloads, all info-terminals were able to be equipped with individual information.

To do this a web based administration area in the GeoCMS is selected, in which the contents can be installed and administered in the backend / upload center. In order to install a bluetooth information download onto the info-terminals the following steps are necessary:

- A. installation of new bluetooth services in the form of a download file (audio / video / text / picture),
- B. data upload of the actual information file (audio / video / text / picture),
- C. a short description of the new service and
- D. the assignment of the services to the individual info terminals in Bremerhaven.

In addition small usability and layout improvements were conducted. On the following picture you can see the backend / upload center of the bluetooth services, the revised download start page of the info terminals and as examples some content areas (audio, text and picture).

Backend / Upload-Center Bluetooth-Services



Tourist content

The info-terminals are placed on 14 excellent spots in Bremerhaven where a lot of visitors are staying. Ten info-terminals will be equipped with the bluetooth service. Within the Smart Cities project we offer four kind of bluetooth-download possibilities: audio, video, text and picture.

The content of audio files (mp3 format) contains historical and actual information of several points of interest like Climate House, German Emigration Center or the history of the New and Old Harbor. The content of the video contains short promotional movies of Bremerhaven. Texts are about the museums, ships or any other information in short version like opening hours etc. Under 'picture download' you can find several impressions of the point of interests.

The visitors and guests from Bremerhaven are our primary target group, but also the inhabitants. So the offer of content is in line with the wishes of our guests. But the kind of information can be expanded if there are new requirements and wishes at every time.

5. Installation of Bluetooth Hardware

After reviewing the locations for the simultaneous connection of the PC and bluetooth box to the internet, it was discovered that additional hardware elements are necessary for the Installation of the bluetooth hardware into the outdoor info terminals.

These are necessary because depending on the locations of the terminals different technologies are used to insure the Internet and electrical connection. In some cases the info terminals are partly equipped with their own internet line via WLAN or via a connection to an existing internet line of a nearby institute.



For this reason the responsible terminal-administrator checked the 10 different locations and tested the respective technical connections to the on site internet for the installation of the bluetooth hardware.

Specialized routers, which are suitable for outdoor use are necessary for long-term operation of the bluetooth boxes. These routers have been selected and ordered according to the necessary technical specifications and the respective outdoor suitability. The respective hardware will be available for installation during the 45th calendar week.

Parallel to this a questionnaire for the following tests with the bluetooth application in combination with the new terminal portal has been prepared. Momentarily the test scenario and the search for test persons are being organized in cooperation with students from the local university.

6. „Bluetooth Terminals“

Bremerhaven, Januar 2011. All locations for the ten outdoor-info-terminals have been decided upon. The first Info-terminal to be equipped with the bluetooth technology was the „Hafeninsel“ terminal. From this central location a test of the bluetooth applications, the handling and manageability of the portal structure and pages as well as the offered services will be conducted by an equally represented group of test persons.

The original idea of using standardized test scenarios had to be rejected, because the test requirements for these special technical prerequisites for the bluetooth applications has of yet not been used in this form. The test results are especially important because the test persons can use their own individual mobile phones. Here we may find various results depending on the system used. When the test results are available and possible necessary technical adaptations or adaptations to the user directive through the terminal portal pages have been made, then the bluetooth hardware and software can be installed into the remaining nine outdoor-info-terminals. This is dependent not only on the winterly weather conditions but also on the decentralized location distribution throughout the whole city area.



- 1 Info-Terminal Hafeninsel
- 2 Info-Terminal Havenplaza
- 3 Info-Terminal Schauenster Fischereihafen
- 4 Info-Terminal Historisches Museum
- 5 Info-Terminal Lloyd Marina
- 6 Info-Terminal Kirchenplatz
- 7 Info-Terminal Deutsches Schiffahrtsmuseum
- 8 Info-Terminal Fähranleger Bremerhaven
- 9 Info-Terminal Kreuzfahrt-Terminal Bremerhaven/Columbus Cruise Center
- 10 Info-Terminal Hauptbahnhof