Integrated Project on Interaction and Presence in Urban Environments

FP6-2004-IST-4-27571

ipcity.eu

First Prototype of City Tales Applications

Deliverable D9.2

Doc-Id:	**D 9.2**
Version:	**1.0**
Author(s):	**Sabiha Ghellal, Rod McCall, Joachim Rothauer**
Date:	**15.01.08**
Status:	**Final**
Availability:	**RE/PU**
Distribution:	**Project Partners / EC / Web /**

#

Table of Content

1 Workpackage Objectives 7
2 State of the Art – Technology Trends 9
2.1 User Generated Content 9
2.2 Computer Vision Tracking 9
3 Overview & Concept Maps 10
3.1 Street Beat Overview 10
3.2 Street Beat Concept Map 11
3.3 AR Animation based on Leo's Adventures 12
3.4 AR Animation & Concept Map 12
3.5 Twelve Principles of MR Animation 13
4 Year 2 Demonstrator 16
4.1 StreetBeat Evaluation 16
4.1.1 Theoretical Background to the Evaluation 16
4.1.2 Evaluation Methods and Tools 18
4.1.3 Summary of Results 19
4.1.4 Conclusion 22
4.2 Leo's Adventures 23
4.2.1 Leo's Adventures Content Creation Tool 23
4.2.2 Mixed Reality Character Animation 23
4.2.3 Animation Details 24
4.2.4 User Centered Integrated Approach 24
4.2.5 Task Scenario 25
4.2.6 Use Scenario 25
4.2.7 Essential Use Cases 25
4.2.8 Low-Fidelity Prototype 26
4.2.9 Specification 29
4.2.10 Leo's Adventures Mobile Content Browsing Tool 29
4.2.11 Early Prototypes 31
4.2.12 Sketching Prototype 31
4.2.13 Task Scenario 32
4.2.14 Use Scenario 32
4.2.15 Essential Use Case 32
4.2.16 Specification 32
4.3 Presence / Approach/ Relevance 34
5 Dissemination 36
5.1 Accepted Publications 36
5.2 Planned Posters 36

5.3 Planned Publications 36
6 Appendix A 37
6.1 Platform Research 37
6.2 Researched Devices 38

Abstract

This document provides an overview of the research and development activities undertaken in the City Tales work package of the IPCity project. City Tales concentrates on the HCI (Human-computer interaction) aspects of presence through a range of ubiquitous technologies and systems. Two systems are discussed the evaluation of StreetBeat, which is a mobile application about the sub-culture of Berlin and Leo's adventures a web based MR content creation tool. Further this report contains a conceptualization of MR animations by providing 12 principles of mixed reality animations which will also be presented at CHI 2008 as a poster. The report discusses the design of these systems, a detailed evaluation of StreetBeat and a peer evaluation of Leo's Adventures. It further concludes the scientific evaluation of StreetBeat by drawing a The Place and Presence "Onion" and the need for a more holistic approach towards presence experience development it also concludes that for Leo's adventure is a darling approach towards mixed reality but that independent of it's success will provide valuable feedback for presence by used HCI research.

Intended Audience

This document is intended as a public document to introduce city tales mixed reality applications. This purpose for this document if to provide a summarized and structured presentation of the IPCity city tales applications planned and developed within the second year of research to other interested researchers and user interface designers.

1 Workpackage Objectives

Objectives Phase 2	• Develop measures and tools that encourage mixed reality content creation. Explore how we can create an atmosphere and natural approach towards mixed reality content creation for “ordinary” people. • Identify the appropriate metaphors and tools for the intended target groups • Create a web based story telling tool “Leo’s Adventures” as an integrated application building upon WP4&5 infrastructure and tools provided. Utilizing the Web 2.0 user generated content trends • Create one common mixed reality story storage system • Foster mixed reality story telling based on the developed story telling tools developed as part of City Tales phase one.
Results phase 2	• A detailed user tests and a thorough evaluation on the year one deliverable StreetBeat. • A web based MR User generated content creation tool Leo’s adventures. • Collaboration on a state of the art MR video browsing tool utilizing computer vision tracking AR solutions for Leo’s adventures • A conceptualization for MR animations. The 12 principles of MR animation.
Evaluation Results Phase 2	• Developed an early questionnaire for assessing sense of place and presence in phone based MR systems • Completed a study of the Street Beat system, findings point to the effect that certain content items have on the sense of feeling inside or immersed. • StreetBeat study also pointed to the need to consider the nature and types of locations chosen and the effect this will have on place and presence. • Most users of Street Beat said they would be willing to pay for it. • Although the navigational aspects of Street Beat could be improved most users found the existing system easy to use.
Objectives Phase 3	• Develop measures and tools that encourage mixed reality content creation. Explore how we can create an atmosphere and natural approach towards mixed reality content creation for “ordinary” people. • Identify the appropriate metaphors and tools for the intended target groups • Create a web based story telling tool “Leo’s Adventures” as an integrated application building upon WP4&5 infrastructure and tools provided. Utilizing the Web 2.0 user generated content trends

	• Create one common mixed reality story storage system Foster mixed reality story telling based on the developed story telling tools developed as part of City Tales phase one.

2 State of the Art – Technology Trends

The main aim of IPCity is to create simple MR user interfaces that use more mature technical innovations to realize its target. StreetBeat (year one Demonstrator described in Deliverable D9.1) and the Leo's adventures content creation tool (described in section 4.2.1) are based on Java (J2ME) and Flash developments without a traditional AR component rather, those solutions try to regard mixed reality from a psychological presence point of view by exploring how music can influence a sense of place and how animations can help creating a performative sense of presence.

2.1 User Generated Content

WP9 based the MR content creation functionality on the user generated content web trends also referred to as Web 2.0. In the Web 2.0 space the demand for user generated content is very strong. In the last couple of years the web sites that offer UGC have climbed to the top of the Internet user ranking.

Below Figure 1 shows a screenshot of the most popular YouTube video that managed to reach over 50 million vies. In the Web 2.0 space the demand for user generated content is very strong. In the last couple of years the web sites that offer UGC have climbed to the top of the Internet user pack see Figure 1. The demand for content is also moving from a mass market appeal to an "infinite" selection of niche content. This is driven by the decreasing cost of (amateur) video production and the proliferation in the channels that delivers this content to millions of potential viewers see Figure 2.

Figure 1: Most watched YouTube Video/ 50 million views, 117.000 comments since 04/06

Rank	Property	Total Global Unique Visitors (MM) 4/07	Y/Y Growth
1	Google	528	12%
2	Microsoft	520	3
3	Yahoo!	468	1
4	Time Warner	267	21
5	eBay	248	(4)
6	Wikipedia	209	71
7	YouTube	163	506
8	Amazon	137	1
9	CNET	120	33
10	Ask	111	(9)
11	Apple	115	29
12	MySpace	107	86
13	Adobe	101	(5)
14	Lycos	79	(14)
15	Viacom	81	65

Figure 2: Global unique visitors(MM) Source: comScore Global Media Metrix 04/07

2.2 Computer Vision Tracking

City tales utilizes IPCity tools developed as part of WP 4&5 outlined in detail in section 4.2.11. The computer vision tracking state of the art will be explained in deliverables 3.2 and 4.2

3 Overview & Concept Maps

The design and evaluation of the systems in WP9 are driven by one of the key questions faced within the project, namely where people feel (a more thorough description of the presence related questions can be found in the deliverables related to WP3). This particular question arises as mixed reality environments combine real and virtual elements, in the case of Street Beat a mobile phone is used to make people feel present in the sub-culture of Berlin. As part of this one of the main aspects is whether people feel inside the locations which are part of the tour, and how this is shaped by the content on the telephone or the types of locations chosen. With respect to the content creation tools in City Tales (e.g.) this question arises as users are now empowered to share their view of Berlin with others. This means it is important to explore how the creation and subsequent display tools allow this notion of "where" to be shared effectively. Furthermore with respect to Leo´s Adventures we are also interested in exploring how the animations and other aspects of the Leo character create a sense of social presence.

	Activity and context of evaluation	Evaluation Approach	Reference Methods
WP9 City Tales	Novel user content creation and storytelling practices	Public evaluation and user/experts evaluation sessions	Public evaluation, interviews, user/experts evaluation

Table 1 Summary of City Tales

In order to address the various presence related issues our approach to evaluating the various systems within WP9 (Table 1 Summary of City Tales) focused on involving end users, through a variety of measures. In order to build on existing presence research while acknowledging issues specific to mixed reality environments we initially extended and combined existing questionnaire methods. These we modified to include questions specific to "where" people felt they were when using Street Beat, for example more in the real environment, phone content or a combination of the two. The results from the questionnaires were then used in combination with observation data obtained during the trials to conduct semi-structured interviews. Furthermore participants were also video taped during their exposure to the various systems and the data obtained was analyzed using a grounded theory approach. Similar methods were used to evaluate Leo's adventures, however users were asked to complete online surveys from their own home.

3.1 Street Beat Overview

Street Beat is a location aware mobile, music based City tour. While exploring Berlin the visitor listens to underground music and stories about city's sub-culture. It features eight locations ranging from an artists squat to a nightclub. The locations and paths between them are augmented with additional information such as music, narratives and pictures. For example the picture on the mobile phone screen will change to the nearest relevant location and when the user approaches they will also start to hear some pre-recorded narrative. Music is also used and this is played between and at the various locations. The locations were chosen by a leading music magazine editor who had the brief of creating an alternative tour which could make people feel as if they had actually been inside locations, even if they had not been able to enter them. A full description of the design of the Street Beat system can be found in deliverable D9.1.

3.2 Street Beat Concept Map

Using the IPCity presence concept map we identified the core areas which Street Beat is exploring the temporal, social and ambient aspects of urban environments. For example Street Beat specifically explores temporal aspects (such as creating memories (traces of the past), transformation of a physical site over time and mobility); social aspects (place making) and ambience (perception and interpretation). These are in turn connected to other elements such as making the invisible/visible, and the medium (e.g. the mobile phone and its content). These are in turn related to aspects such as co-construction of presence, mixed reality configuration and awareness cues.

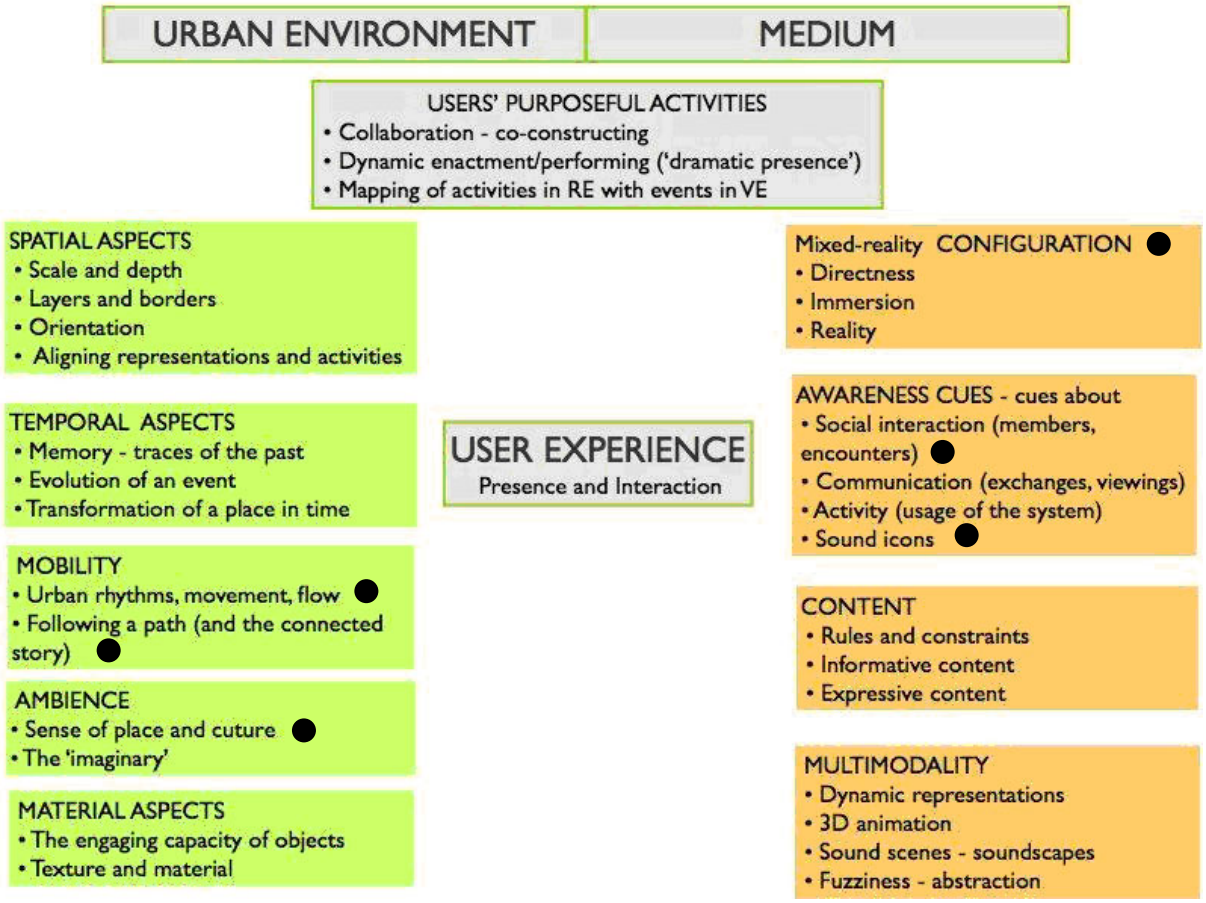


Figure 3 Presence Concept Map and Street Beat. The areas marked with a circle represent aspects relating to Street Beat.

Among the key aspects of Street Beat is the creation of multiple overlapping realities, either from the perspective of imagining what it would be like to meet people in one of the locations or what it would have been like to have visited locations in the past. Coupled with this is the desire to make people feel immersed within the overall experience, for example, by using real world routes and paths through the environment to create a feeling of being within an overall cultural experience, one which is different from the here-and-now of everyday life.

In order to explore the items within the concept map a study of Street Beat was conducted in August 2008 which had two primary objectives (1) assess the effects of place and presence of the various content items within Street Beat – see section 4 (2) to develop methodologies for testing such applications. A small pilot study was conducted in December 2006 (see deliverable D9.1) which used similar methods.

3.3 AR Animation based on Leo's Adventures

Leo's Adventures is a web based MR user generated content tool that will be based on a flash based web interface. The visitor will be invited to browse the content created by others and to upload their own videos and create an MR video via simple post production animation tools. Figure 4 illustrated a AR environment using Leo and Figure 5 illustrates a Leo AR flow of animation.

Figure 4 Leo in the real environment (Detailed Describtion in section 4.2)

Figure 5 AR Animation (Detail Description in section 3.5)

3.4 AR Animation & Concept Map

We concluded as part of our initial research of year one that in order to enable an average user to create content using 3D animations we need to conceptualize how to create mixed reality animations. By looking at traditional animation we came across the 12 principles of animation that were created by Walt Disney and still find appliances today. In order to include dynamic representations and 3D animation in the IPCity Concept Map, see figure 6 we have researched and identified 'mobility' and 'multimodality' as main categories, including dynamic representations and 3D animation as the main applicable presence themes in collaboration with WP3.

Further, we developed a set of 3D animation principles, see section 3.5.

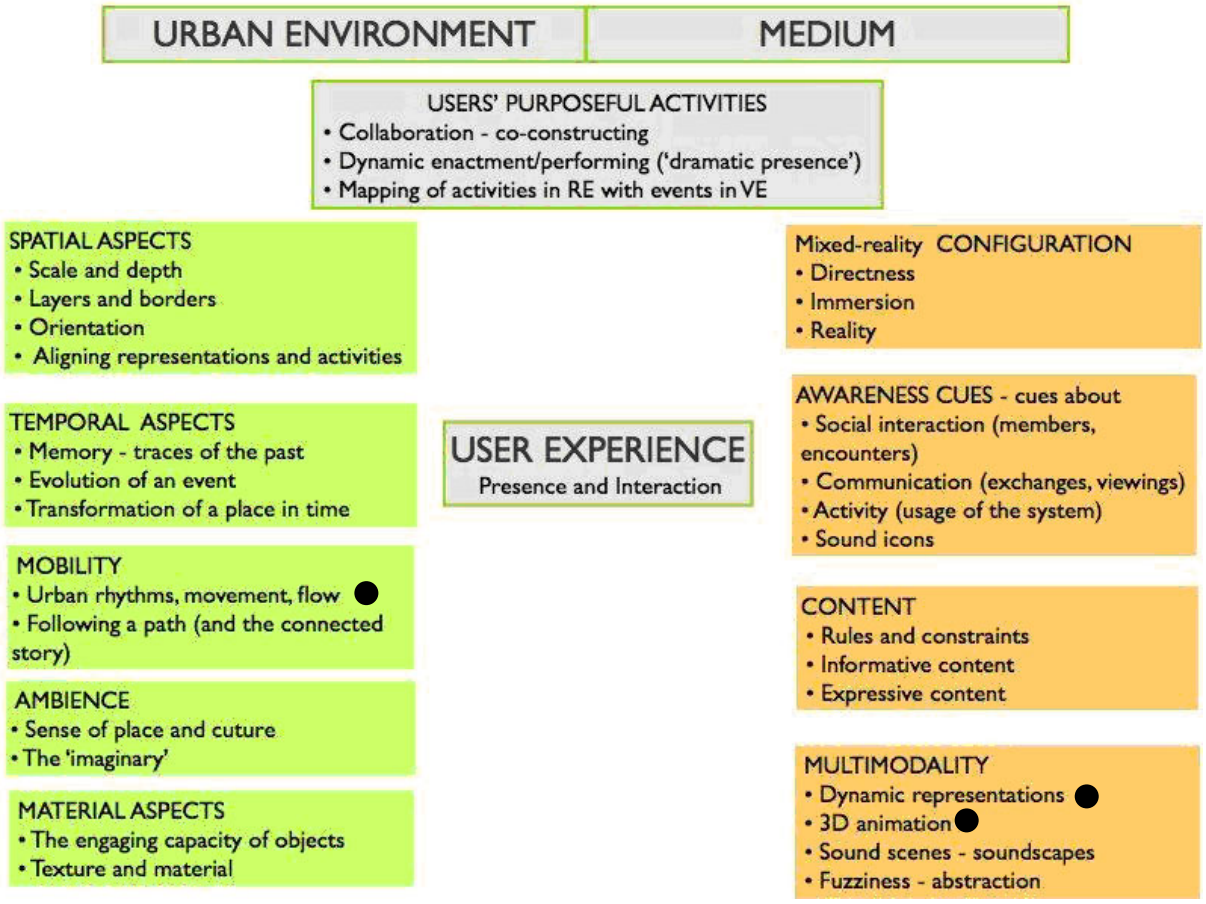


Figure 6 Presence Concept Map and 3D Animations. The areas marked with a circle represent aspects relating to 3D Animations.

3.5 Twelve Principles of MR Animation

The 12 principles of animation where created by "Disney's old men" during the funding era of the Disney Production Studios in the 30tiew and still find appliance today. However in order to apply them for AR or MR application that will have to be rewritten in order to cater for the special circumstances of merging the real with 3D animations. During the design phase of the 3D character Leo we used elements of Disney's 12 Rules of Animation e.g. Leo has been created and animated aseptically for mixed reality purposes. Leo is based on projections and his semi transparent features remind of liquid surreal elements, this design makes it easy for Leo to blend into the real environment see Figure 4. We created Leo based on Disney's 12 Rules of Animation such as e.g. the Squash and Stretch rule illustrated in Figure 5, where the character Leo squashes on the ground and stretches in the air when he jumps up. The main reason for applying Disney's rules of animation was to create some instruction of how to produce appealing 3D content for MR applications.

PRINCIPLE	ANIMATION DEFINITION	MR MIXED REALITY DEFINITION
SQUASH & STRETCH	This principle was traditional applied to give the illusion of weight, volume and gravity. This rule still applies today but with photorealistic animations the intensity has changed (see exaggeration)	SQUASH AND STRETCH: This principle was traditional applied to give the illusion of weight, volume and gravity. This is also true for Mr content creation but one has to ensure that the created character matches the real environment in which he/she or it will be placed.
ANTICIPATION	Anticipation is a narrative tool to create a sense of tension. Disney's old men suggested to "preparing the audience for a action a character is about to perform such as e.g. a backward motion before a character starts to run".	ANTICIPATION: If narration is used in a MR animation the story line should be considered under the circumstances that there is an unknown environment in which the animation will be portrayed, the real world. It will be necessary to test several narrations techniques before one finds a story that will be suitable of the real environment in which it will take place.
STAGING	A pose or action should clearly communicate to the audience the attitude, mood, reaction, or idea of the character as it relates to the story and continuity of the story line.	STAGING: Since the MR animation will be staged in the real world it is important to visit and measure the intended environment to place the animation correctly. Ensuring 6 degree of freedom will be necessary to place the character correctly in it's surroundings e.g. if an animated person is designed to work on a construction side in a city the person will have to stand on the ground and not above or below it. Tracking tools such as markers will help to solve this issue.
STAIGHT AHEAD & POSE TO POSE ANIMATION	This rule explains the two animation tools that were traditionally used to create an animation with newer technologies those two animation styles still find appliance.	ANIMATION METHODS (Originally named STAIGHT AHEAD & POSE TO POSE): MR applications often require interactive animation. Primarily, this means that a content creator needs a tool for putting animated 3D characters into an interactive graphical application. In addition the heavy rendering capacity necessary to run a MR application will make it necessary to control the level of detail of the 3D character by reducing or increasing the polygons that make up the character at runtime.
FOLLOW THROUGH AND OVERLAPPING ACTION	When a character stops his features such as hair, tails etc. catch up. Nothing stops at the same time.	FOLLOW THROUGH AND OVERLAPPING ACTION: For MR Animations it is necessary to define the borders in the real environment in which the character will move. E.g. a tree or a house should be treated as obstacles in order to prevent the character to walk through it. One possible approach could be to create transparent obstacles within the animation or one could use computer vision tracking for realistic augmentation of a character in the real world.
SLOW-OUT & SLOW-IN	As action starts, we have more drawings near the starting pose, one or two in the middle, and more drawings near the next pose. Fewer drawings make the action faster and more drawings make the action slower.	SLOW-OUT & SLOW-IN: To create believable characters and animations in the real environment one has to blend characters into selected environment. By slowing down the beginning and the end of an animation one can not only add realism but also ensure that MR users get a chance to process the additional information.
ARCS	All actions, with some exceptions (such as animation of mechanical devices) follow an arc or slightly circular path.	ARCS: No creature moves in straight lines, making the creature move in an arc in the real world adds the complexity of fitting the arc into the real environment.
SECONDARY ACTION	This action adds to and enriches the main action and adds more dimension the character animation. Supplementing and/or re-enforcing the main action.	SECONDARY ACTION: Again, the secondary action may be provided by the real world in the MR environment however there is also the possibility to add secondary action to the main MR animation to improve narration.
TIMING	Timing is one of the core elements of animation, from the technical details of key framing to the reproduction of real movement.	TIMING: Timing is also a core element of MR animation but here are more factors that have to be taken into consideration. The time that is stipulated by the real environment and the time a user needs to move around in the real

		environment.
EXAGGERATION	For Disney's classical animation exaggeration should be extreme, but “exaggerating” in a brooder sense also works well in more realistic animations because mimic reality is not controlled or constant. Different artists have different views on how we should exaggerate.	EXAGGERATION: In MR application is it sometimes necessary to exaggerate to fit an animation into the real world e.g. the colors and contrast has to be exaggerated in order to make an animation visible in a bright environment.
SOLD DRAWING	The expectations towards 3D animations have changed dramatically of the last decade. With more and more digital animation tools such as 3Dmax and constantly improving processing power the market for photorealist texturing and animations sky rocketed.	SOLD DRAWING: Even though rendering capacities for MR applications are not ready to deal with highly pixilated animation details such as hair, it is important to apply solid drawing. Only if a character or a 3D image is believable one will be able to achieve successful presence. The trade of between light animations and realism of the character or image will have to be considered carefully.
APPEAL	Animated character should be appealing and suitable for the storyline and intended audience. Very often the appeal of a character can decide over success or failure of an animation no matter if this is a game, movie or a mixed reality animation.	APPEAL: Most MR animations have been produced by scientific researchers with an emphasis on the technical solution; which means that the appeal of the animations was secondary. However if MR would like to take a bigger step towards commercialization MR 3D animations will have to improve the appeal in order to attract larger audiences and increase presence

Table 2. Animation Aspects and MR Cartoons

4 Year 2 Demonstrator

Based on the year one demonstrators we continued work on our integrated prototype for city tales applications. As illustrated in the year one IPCity results in D9.1 we split city tales into browsing and content creation tools. Our long term plan is to merge the two applications into one during phase three as illustrated in Figure 6.

During phase two we focused on MR user generated content creating too "Leo's Adventures" and conducted a complex StreetBeat study in order to further evaluate the research results of the year one demonstrators. See section 2 and section 0 for more details regarding the study.

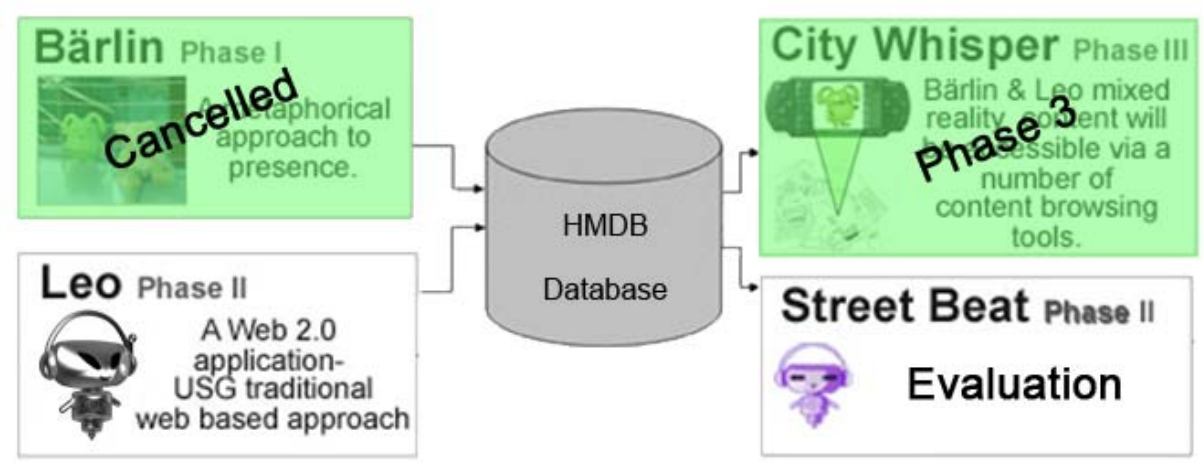


Figure 6: Year (Phase) two Demonstrators

4.1 StreetBeat Evaluation

A detailed evaluation of StreetBeat, a year one demonstrator, was conducted during this second year of IPCity.

4.1.1 Theoretical Background to the Evaluation

In contrast to more traditional presence research (see D3.3 for a review), the Street Beat system does not seek to situate people in a virtual world which is cut off from reality, rather it seeks to augment reality with music, narrative and pictures in order to provide a window into another world, or perhaps even a door into it. It aims to achieve this by combining elements which support physical and social presence. Users of Street Beat visit a number of places along a pre-defined route, where the objective is to make them feel present in some form of cultural experience – the cultural experience being a combination of the mobile phone content and the locations which they visit or walk past. It is therefore important to consider how place has an impact on their sense of presence.

There are many definitions of sense of place, but broadly speaking most researchers agree that it is a combination of physical properties and higher level subjective aspects such as meaning. Indeed the model proposed by states that place is a product of physical elements, activities and meanings. Gustafson [20] further extends this with a complex three pole model which includes these elements but is primarily driven by the relationship between self, environment and other people. Tuan's [19] conceptualisation of place (Table 3 Tuan's model of place) provides an extension to the place models described earlier by specifically mentioning a cultural layer. Tuan posits that place is a locale created, shaped and made by

its users. Critical to his theory is that sense of place is individual and primarily based around the presence of others and interactions with them.

Place	Cultural: related to rules, conventions and cultural identity of a place
	Social: the interactions and communications within a place
	Personal: related to feelings, emotions and personal knowledge
	Physical: buildings, objects, structures and materials

Table 3 Tuan's model of place

Within StreetBeat our objective is to make people feel part of all of the above layers, however of particular interest is the cultural layer. This is in sharp contrast to many other virtual and mixed reality systems where people are asked to feel present within the physical or social dimensions – although these elements are also part of the experience. Indeed it is this shift of emphasis, from spatial (physical) to cultural which is the core aspect of the system. The issue is further complicated by the fact that often users only hear stories, music or see pictures of the location and for the most part can only stand on the street outside – although at a small number of locations they can also go inside. Thus the system often creates little more than a perceptual illusion through a comparatively basic mediated environment.

Drawing on the work on Benjamin [23], Macintyre et. al [24] suggest that aura is a critical aspect of mixed reality applications which must be considered in addition to sense of place. Borrowing their idea, the Street Beat tour should elicit some form of cultural meaning for most users, whether they are new to Berlin or live in the city. However for those who are familiar with Berlin, the elements of Street Beat will have an additional significance. For example places where they have visited or met new friends. An aura may also emerge for those who have some understanding of the underground culture of Berlin and other cities. This aura will in turn shape their positive or negative feelings towards the locations within Street Beat. The key aspect here is that the mediating technology does not create the aura, rather that aura is invoked by any pre-existing knowledge that the person has of the space. Importantly through there is a relationship between the aura, mediating technology and presence, and poorly chosen technologies or content may have a negative effect on the aura and thus presence. For example using an inappropriate picture to represent the inside one of the tour locations such as Tacheles.

The locations in the tour were also chosen due to their connection to the underground culture of Berlin, from the perspective of music, arts, drinking and theatre. The actual significance being dependent in part upon the users past experiences of Berlin (if any). The experience is further augmented by the use of music, narrative and photographs. Thus (as noted by Macintyre (see [24]) the driving element in the design of the system is the sense of place and presence engendered through the combination of reality and unreality. Thus returning to the concept map in Figure 6, the path through the city (mobility) combined with the geo-localised icons (content) will have shaped there perception of the environment, thus leading them to become aware of past events and previously invisible relationships. This in turn should lead them to creating a sense of place (place making) and ultimately a sense of immersion within given locations.

4.1.2 Evaluation Methods and Tools

Study Methods	Based on the results of the pilot study the methods used were redesigned, primarily to draw upon existing knowledge and also to more accurately capture the user's responses. A copy of the questionnaires and other documents used can be found in Appendix X.
User Profile	Each participant was asked to sign a liability waiver form, therefore excluding the evaluators from any responsibility during the trial. They were also asked to complete a short profile which contained information such as age, occupation and gender as well as experience of mobile phones, electronic tour guides and computer games.
Questionnaire	The questionnaire was designed to capture information about the relationships between properties of the experience and higher level issues. We adopted classic question type approaches for the basic issues such as asking people to describe their experience, in combination with Likert style responses and repertory grids. As well as the questionnaire containing examples of how to answer certain questions the evaluator also provided an explanation. We explored a number of existing questionnaires for assessing presence, and none appeared to be directly relevant to the issues which were wished to explore within Street Beat. Therefore we adapted the MEC [22] spatial presence questionnaire, and combined this with the place probe [21]. The modifications primarily reflected the desire to explore where the users felt, for example more in the real environment, more in the places as described on the mobile phone or in a combination of the two.
Video Analysis	The participants were video taped during the study. The objectives of the recoding the users was to capture where they walked and any specific problems they may have experienced, for example becoming lost or if the phone crashed. For the most part the recordings were taken at a distance from the participants, for example 3-5 meters in front or to the side. Hence they did not always capture what the participants said or were doing with the phone. However when problems arose the dialog was often recorded. Moreover, by video taping from further away it was possible to capture strange interesting events or people in the streets, for example the man wearing only underwear who began shouting at other people next to a café, hence distracting the participants. From an analysis perspective the data presented in this paper focuses on where they become lost, clearly observed problems, or comments made to the camera.
Trip Notes	In addition to the video analysis each participant was observed by an evaluator and notes were taken. These notes included information such as problems encountered, questions asked and any other relevant information. While a large part of this information was also available from the videos the notes also provided a way to note down any issues which would be of interest during the later interviews, thus avoiding the

	need to review the videotapes prior to each interview.
Interviews	All participants were interviewed after their experience, the questions were based on any notes taken during the tour as well as data obtained from the questionnaires. This approach results in a situation where themes of particular relevance to the user would emerge and also for topics to be discussed which could not normally be identified either from the video tapes or video analysis. There were no time constraints on the interviews however they typically lasted around five minutes.
Participants	A total of thirteen participants took part over a one week period in Berlin during August 2007. The group consisted of 8 male and 5 female participants. All except one participant was a resident of Berlin. The group consisted of a mix of students and young professionals aged from 25 to 36. When undertaking the tour some participants did so by themselves and others in groups.

4.1.3 Summary of Results

The summary presented here consists primarily of correlations, however it should be noted that correlations based on ordinal or rank data are not as robust as when interval data is used. In the following data a high correlation is deemed to be when r>0.5, a medium correlation r>0.2>0.5 and anything less than 0.2 irrelevant. It is acknowledged that such bandings are open to interpretation, however it is not expected that many of the aspects (e.g. music, pictures or narrative) will have a substantial effect on their own but rather that they will form part of an overall experience which shapes the users sense of place and presence. Hence the correlations should be taken as in indicative link of some form of relationship requiring further work rather than a certain statement of causality or relationship. A significance level of p<=0.05 is take to mean the result is significant. A Cronbachs Alpha for the entire dataset was calculated and yielded a result of α=0.8878.

This study provided a way of exploring the effects of content across various locations, and how such change could alter the feeling of being inside, or present. Prior work on the relationship between presence and sense of place has pointed to similar links (ref Benyon et all). In particular how seemingly basic changes in content can result in an altered sense of place and presence, this study points to similar patterns emerging (Ref short paper on sudden sounds).

“I could imagine actors on the stage” (participant 9)

“Especially on locations like the Volksbühne a possibility to go inside would be very important because that would be much more interesting than only observing it from the outside.” (participant number 4, translated from German).

As noted in the earlier pilot study (see deliverable B9.1) it is important to consider the nature of the location which forms part of the tour. As expected basic elements such as the amount of access people have radically alters their feelings towards the place, this was reflected in the scores given to Haus Schwarzenberg and Tacheles, both of which were rated as strong favourites Where people cannot enter the location it is important to provide ways which allow people to visualise in some way the activities which they would find there. This was reflected in the favourite score given to Volksbühne, with some commenting that they had seen or

could imagine quite easily what goes on there. Moreover what they could imagine is perhaps more interesting than the comparatively low scoring BPitch, which in reality is little more than an office. One interesting paradox seemed to emerge that although participants felt the phone content in Volksbühne did not make them feel inside, they did feel much more inside the real location. Again this may be related to being able to easily imagine what goes on inside.

“Tell some more stories, more particular stories, not such general information… more interviews of people who had participated. Other people who have had the experience… says ‘or I have to go tonight’… a little more actuality…. More like a radio feature would be nice” (participant 1, interview)

From the perspective of specific content items it is perhaps surprising that music did not appear to be correlated to any extent with the feeling of being inside or immersed in any particular location. This could in part be explained by the nature of the measuring technique and the Street Beat system as the questionnaire typically focussed on feelings at particular locations and in Street Beat the music stops when the narrative begins. Hence each location probably by default appears more connected to the narrative than the music. However there does appear to be a moderate impact on the feeling of being inside somewhere and the use of narrative and pictures. With some participants commenting that this would be further enhanced if the narrative felt more live or spontaneous. There were similar comments with respect to the photographs with people suggesting that there should be greater use of videos and shots of the insides of the various locations.

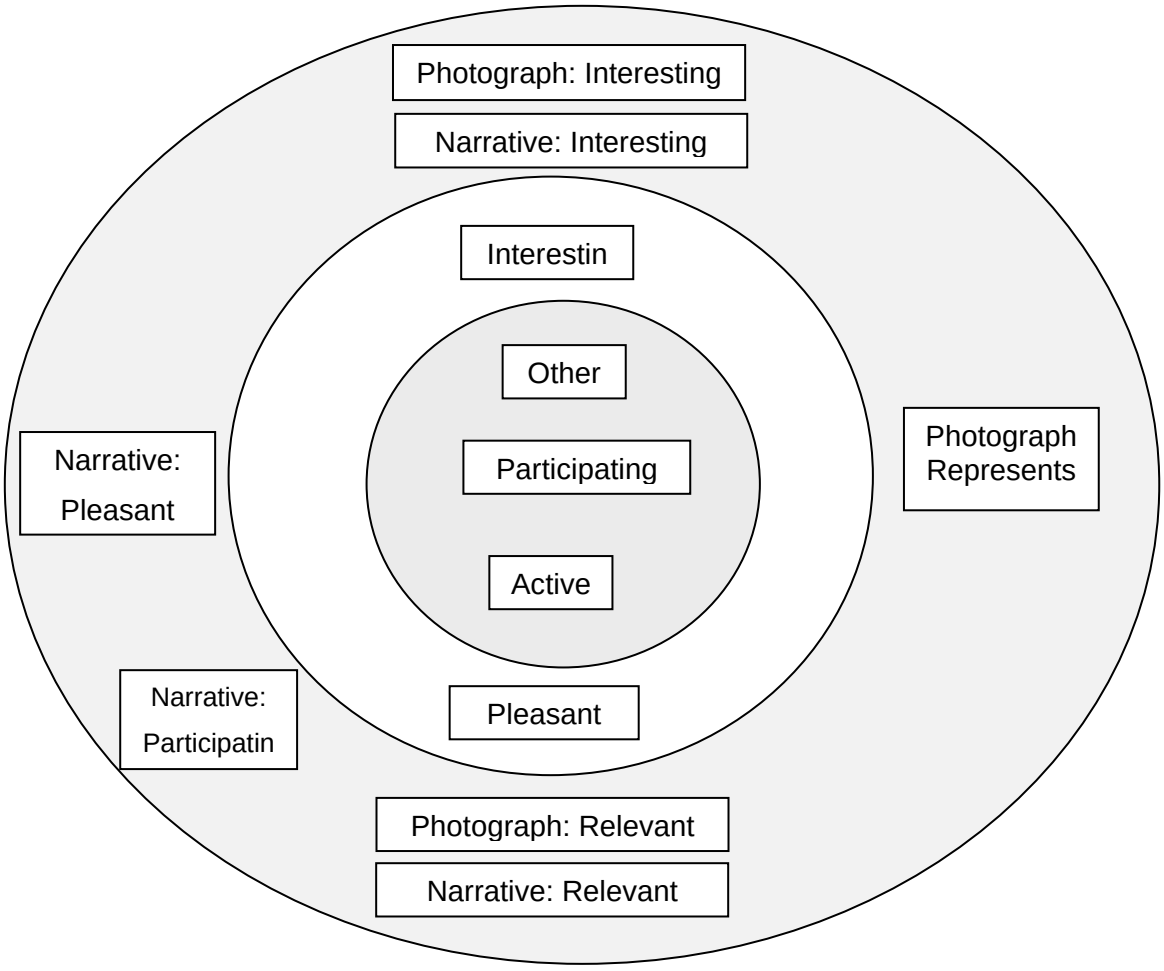


Figure 7. The Place and Presence “Onion”. Items with higher correlations to presence and place are situated at the centre of the onion.

The “onion” diagram in Figure 7 summarises the relationship between the feeling of being inside as created by the overall mobile phone content and the various elements which constitute the content. The innermost layer consisting of “others, participating and active” represents those items with the highest correlations to feeling inside. The next layer consisting of “interesting” and “pleasant” with respect to the overall phone content and represents lower correlations. The outer layer represents individual content elements and how they would appear to impact upon the sense of feeling inside. The Figure bears many similarities to earlier work on place and presence. For example much of the presence literature and evaluation methods place emphasis on the ability to undertake activities within a space, moreover the importance with respect to social presence when it comes to issues such as feeling with others. Although in the results presented here it should be noted that the participants viewed others as either people on the tour with them or people who inhabited the various locations. Interestingly the effect of the subjective attributes such as pleasantness and relevancy of content to the feeling of being inside is lower than the more physical aspects such as feeling like they are active or participating. This finding would appear to suggest that presence in itself is a combination of lower level attributes such as feeling able to interact with content and objects, and the various sensory stimuli which occur and also the more subjective elements of the experience. Furthermore this view would also appear to validate the idea adopting some elements of the Gibson model of affordances within the context of presence. For example Street Beat seeks to merge the feelings created by virtual and real elements, so that the user enjoys a unified experience. This corresponds with Gibson in the sense that he sees affordances as being independent of media type, e.g. real or virtual. Also, the user is not separated from the environment, rather they are situated within it and through the Street Beat experience they should feel as if they are part of the cultural experience (whether these be people, locations or objects), and in turn their perception of the space is related to their interest in the content (as represented by the second region) and their perception of the relevance and interest of specific content elements (third region). The latter corresponds in some respects to the idea that perceived affordances arise through need, which in this study is the desire to complete the tour and also interest in the content. A view at least in part shared by Mantovani and Riva who state that reality is continually shaped be cultural, social elements which are constantly being filtered and negotiated, and it is this process which gives rise to the needs and therefore affordances. However the important aspect here is that Street Beat invariably only provides perceived affordances, as in many cases the users cannot interact with any elements of the locations – beyond perhaps standing at the entrance.

“Tacheles has become so boring… everyone goes…. Everyone has been told this story 100 times, all this metal art is so old fashioned” (participant 1, interview)

There are some similarities between Figure 7 and the place models described earlier. For example the Relph [2] both have activities as a key part of sense of place, as do other people (which he classifies as physical properties). Furthermore, he posits that higher level issues such as a place being fun, boring or sad are relevant, in the study here these higher level issues are represented by aspects such as interest and relevancy of the content. There are also some connections to the Gustafson [20] three pole model of place, as sense of being within a place is very highly related to aspects such as others, activities and subjective issues such as interest. Similar links emerge when compared to the Tuan model, in particular the social (others) and personal (interest) dimensions. It is also clear that prior knowledge or aura of a place has some impact on user perception. This was noticed with respect to Tacheles where one user reported it has being boring, simply because she and most of Berlin are already very familiar with it. However an exploration of aura and exactly which cultural dimensions users were experiencing is beyond the scope of this paper.

“Sometimes I felt distracted by the mobile phone, perhaps there should be a signal if you are taking the wrong way.” (Participant 8, questionnaire).

Other issues which applied to the overall tour included problems with the map display, at present it does not use any form of aural cues and relies on the user constantly checking the display. This was not always a problem within this test as most participants were familiar with Berlin. However it was noted that one user never used the maps and required regular assistance with the directions – he later commented that he had problems with map reading. Despite these problems the users commented that with the exception of the maps the Street Beat tour was easy to use. When asked if they would buy the system 10 of the 13 respondents answered yes, the average price chosen was approximately 6e, with the price ranging from 3-15. However the majority of those who indicated they would pay suggested a price of 3-5e (source: Street Beat study: August 2007)

4.1.4 Conclusion

From the objective of specific design guidance important consideration needs to be given to elements such as narrative and the use of pictures, in particular those which would shed some light on the inside of the chosen location. As appropriate pictures would perhaps allow people to feel more inside the given locations. Other specific aspects include choosing locations which afford more possibilities for interaction (activities), whether this is simply by allowing people to access them or whether in the form of objects and other people. The feeling of being with others was also a key element of the experience, whether this is with other people on the tour or those which are perceived to inhabit the various locations. Narrative is a key driver in creating a feeling of presence and place and there is a need to consider how to make better use of this type of content. One surprise finding was that the study found no relationship between place, presence and music – however this may have been down to the measurement method and design of the system rather than the music itself. Macintyre at al [24] highlighted the importance of considering the impact of the mediating technology and content on creating a sense of aura, the results would appear to reinforce his views, not only from the perspective of using appropriate narratives and photographs, but also in choosing which locations to have as part of the tour (i.e. perhaps removing Tacheles). Indeed some earlier comments point to the need to let the user have some degree of choice over the content, thus also affecting the aura they experience.

From the perspective of the overall theories of place and presence, there appears to be common elements which arise between the traditional models of place and presence and the results from this study. However although many of the same themes arise it the traditional views, especially of presence is not as applicable within the application presented here. Indeed many of the traditional presence models specifically ignore higher level issues such as interest etc, where as the results point to them having an important impact upon the users experience and hence their sense of place and presence. Indeed such a view as presented in Figure 8, while building on earlier presence and place research suggests that as there is a strong link between the real and virtual elements in this study, a more holistic approach based around the affordances of the environment is more appropriate.

In summary this evaluation set out to explore the sense of place and presence experienced by users of a mobile phone based tour system. A model of the results which summarises the findings in Figure 8 points to a number of aspects which are important in shaping the experience. However, as expected no single content element e.g. music, narrative or pictures had a high impact on its own with respect to these elements. Rather they create an overall combined experience which when situated in the context of the tour e.g. passing the real locations and encountering sometimes strange people on the street allow the user to begin creating a sense of place. The content reveals to the user elements they may have been unaware of, for example famous people who once visited these locations or information about the past. This place making ability and subsequent sense of being inside was heavily influenced by the perceived affordances which the experience offered i.e. the feeling of being

active and being able to participate. Based on these findings it would appear that a Gibson type approach to presence within mixed reality, i.e. one where affordances are considered a key element of the design and evaluation process, represents one method of considering place and presence in the context of mixed reality environments. Indeed the Gibson approach specifically ignores the problems of reality vs. unreality but rather places at its core the overall experience, which in the case of Street Beat is the relationship between the elements and their subsequent impact on the users sense of place and presence.

4.2 Leo's Adventures

Leo's adventures is split into two sub-projects a content creation and a content browsing tool.

4.2.1 Leo's Adventures Content Creation Tool

Leo's Adventures is a web based MR user generated content tool that will be based on a flash based web interface. The visitor will be invited to browse the content created by others and to upload their own videos and create an MR video via simple post production animation tools. The story tells about Leo the alien from the planet of "CISUM 52" landed on earth to research human emotions. Leo's first stop on earth is Berlin where he is trying to find out about subculture and music. Leo needs the help of users to find the coolest spots in Berlin by uploading a short video and placing Leo inside their stories. The content will be stored geographically both on the web interface and in the real world to allow for a MR exhibition in the real world at a later stage of the project. For Leo's adventures we are using an iterative approach. Starting of with base functionality and a limited number of animations we will create a explorative evaluation using a participatory heurist evaluation. After another user interface design iteration we will evaluate Leo's adventures based on the below outlined WP3 Presence concept map:

4.2.2 Mixed Reality Character Animation

Leo is a 3D character that has been created and animated aseptically for mixed reality purposes. Leo is based on projections and his semi transparent features remind of liquid surreal aliens but at the same time he is a likeable naive little creature that means no harm. We created Leo based on Disney's 12 Rules of Animation such as e.g. the Squash and Stretch rule illustrated in Figure 9, where the character Leo squashes on the ground and stretches in the air when he jumps. The main reason for applying Disney's rules of animation was the fact that we wanted to create a character that would be subject to the rules of gravity and cater for an element of abstraction for narrative purposes. In addition we wanted to make the 3D character as unrealistic as possible in order to provide the user with a powerful narrative tool. It was also necessary to create a set of animations that would allow the users to create his/her own story with simple web based navigation on an unknown video.

Figure 8: Leo's Jump & Turn

4.2.3 Animation Details

For the initial Leo's Adventures web interface we decided to test two movement animations jump, see Figure 8 and hover. The movement animations have been created for a MR user generated post production web interface and allow for easy integration in to a number of different videos and background. This is why we created a transparent virtual character with little human characters, we wanted to leave as much narrative freedom as possible to the users by allowing e.g. for the character to hover from the sky or jump of buildings. Unlike the movement animations we wanted to apply human characteristics to the mood selection for the web based post production tool such as happy, see Figure 14, sad, see Figure 14 and wink, see Figure 13.

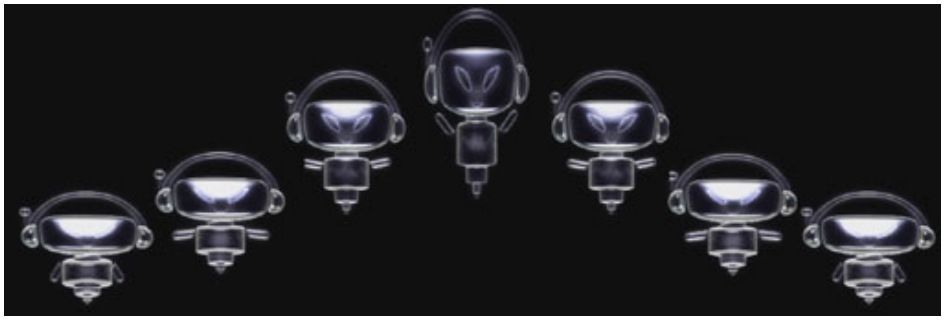


Figure 9: Jump

Figure 10: Speak

Figure 11: Wink

Figure 12: Happy & Sad

4.2.4 User Centered Integrated Approach

For the Leo's adventures prototype we used a user centred approach which will continue during phase 3 and 4 of the City Tales research. Below Figure 14 illustrates how we initially

used a explorative peer evaluation to create the initial user interface and how we will continue to hold a medium size User tests before we will actually make the UI publicly available.

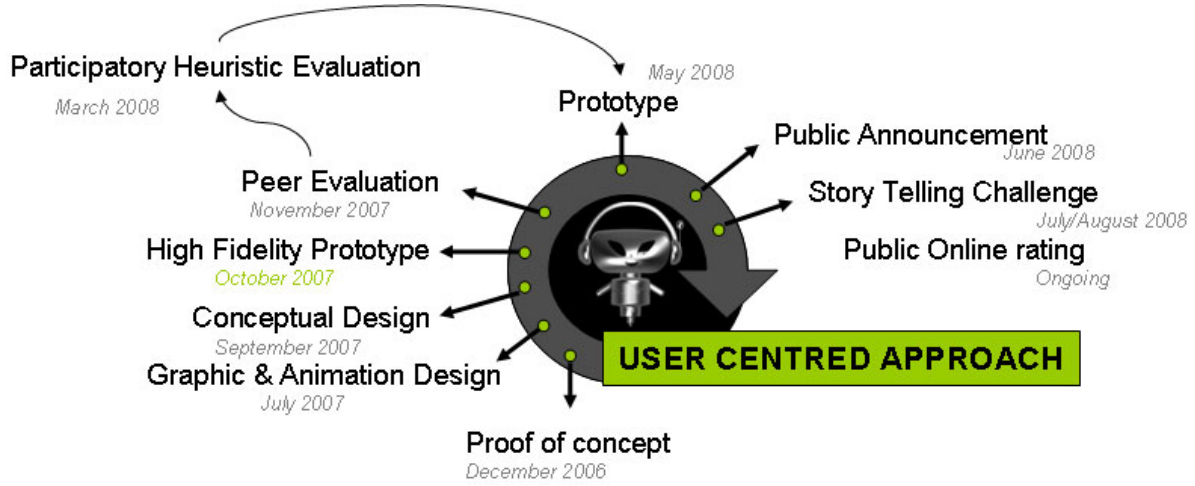


Figure 13: User Centered Approach

4.2.5 Task Scenario

Mario a 19 years old pupil found out from a friend from school that one can create a “mixed reality” video on the Leo’s adventures web interface. He produces a video using his mobile phone and loads the video via a Bluetooth connection from his mobile phone to his PC. Then he opens the Leo’s adventures web interface and uploads the video and once he can see his video on the web interface he can start to animate the 3d character into his uploaded video. After trying view animations he finally decides to upload his last animation back to the server and places the story at the “U-Bahn” stop Potsdamerplatz where he produced the video and then tells some of his friends to go visit his story online.

4.2.6 Use Scenario

Mario a 19 years old pupil sits at home at his PC and uploads a video to the web interface Leo’s Adventures. One the homepage he clicks on “upload your Video” and follows the step by step instruction” then he opens the “Animated Leo” interface where he selects a number of animations and plays them on top of his video. After trying a number of animations he saves one and then opens the “place your video” web interface and places the video on a U-Bahn stop on a 2D Map of Berlin.

4.2.7 Essential Use Cases

The essential use case entails four sub-scenarios that our user Mario undertakes in order to create and brows Leo’s adventures online.

- Upload Video

- Animate & Upload
- Place Video
- Browse Stories

User Action	System Response
Mario accesses “Upload video”	Shows standard widows based file upload window.
Mario accesses “Animate Leo”	A sub menu opens with a window that shows the uploaded video and a view animation tools appears.
Maria clicks on “Save Animation”	The video incl. the animation are saved to the web client server
Mario accesses “Place Video”	A sub menu opens with the Map of the Berlin city center opens.
Maria accesses “Brows stories”	A sub menu with a map of the Berlin city center opens with icons where stories are located opens
Mario clicks of a story icon	An uploaded Video is streamed.

Table 1: Essential Use Case

4.2.8 Low-Fidelity Prototype

Once the main movement and facial animations have been designed based on the 12 principles of MR animations we designed a number of low fidelity prototypes have been created as Photoshop files and entail the functionality outlines in scenarios and use cases outlined in section 4.2.6 and 4.2.7.

Main Page

The home page has been created to introduce the 3D character Leo and affords “uploading a video”, “create and animation” and brows existing content, see Figure15. The main aim of this introduction page is to set the stage of the character Leo and inform the user of the main functionality of the web based MR content creation tool.

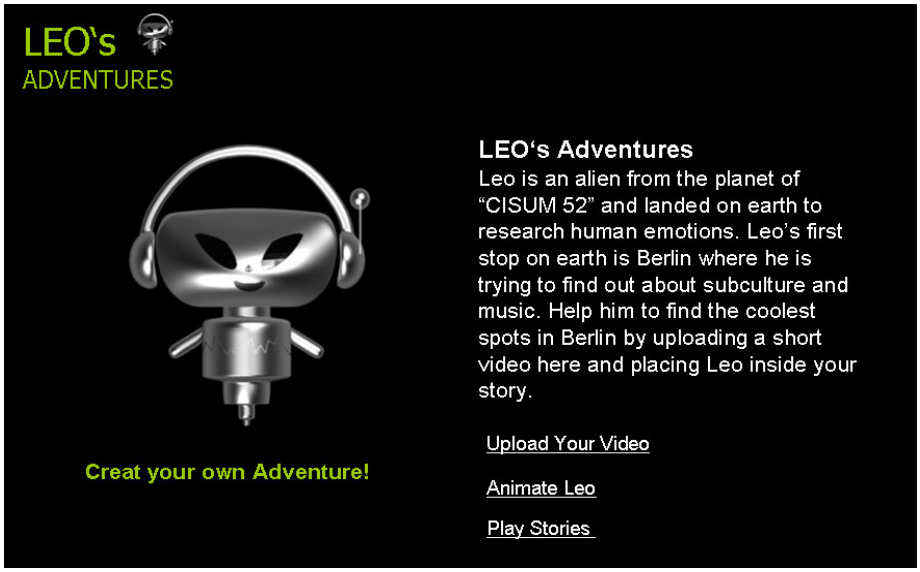


Figure 14: Main Page

Upload Video

Figure 15 shows the video upload tool that includes an integrated Microsoft upload tool that is based on Web 2.0 standards. The main information necessary for the user for a web 2.0 video upload are the supported formats. Similar to YouTube we offer .WMV, .AVI, .MOV, and .MPG formats. The video will be all reduced to a predefined size (regardless of the videos pixel quality) to ensure a common format for video browsing.

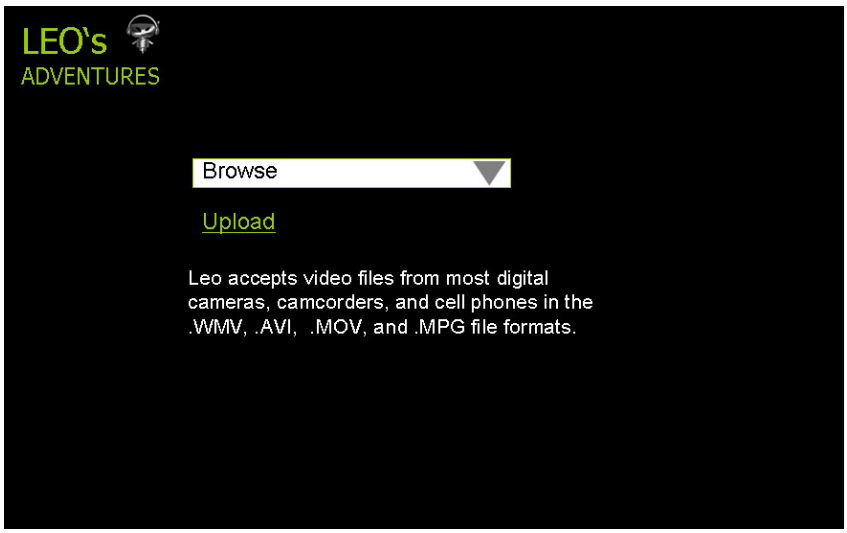


Figure 15: Video Upload

Animation

The actual animation of the character Leo on top of the uploaded videos is the most challenging user interface design. Since it has to be clear for the user how to animate the character and then save the movements to the uploaded video. The user will be asked to first of all place Leo into the video by drag and drop and then change its size using the mouse. Secondly the user is asked to select a mood and thirdly the character can be moved using the available movement methods, jump, hover or turn. Finally the user is asked to save the adventure and is then automatically linked to “place the video on a map”.

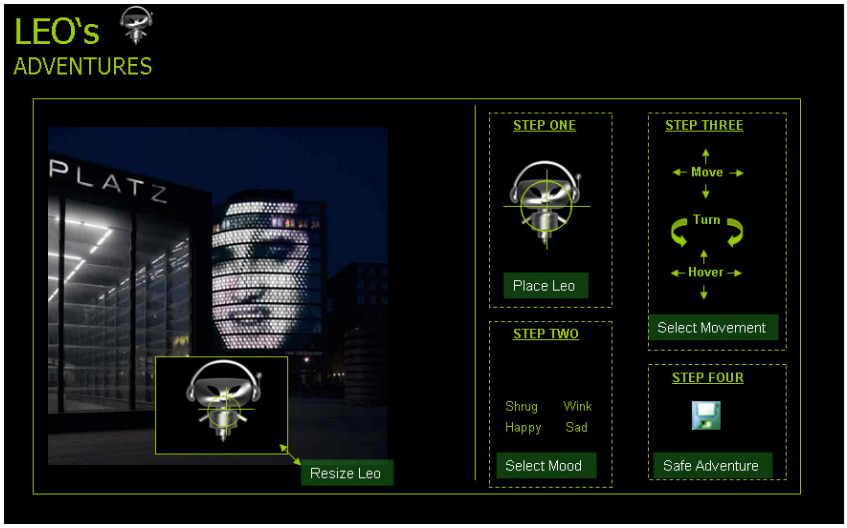


Figure 16: MR Animate (virtual character into a video of the real world)

Online Story Browsing

Figure 17 illustrates the map based story browsing tool. The user will select the stories based on geographic location rather then based on story title or any other categorisation. This will allow for an element of randomness on the one hand but also a selection that is based on a sense of place. Once the user has clicked on a story icon an integrated video player will appear and play the video within the client.

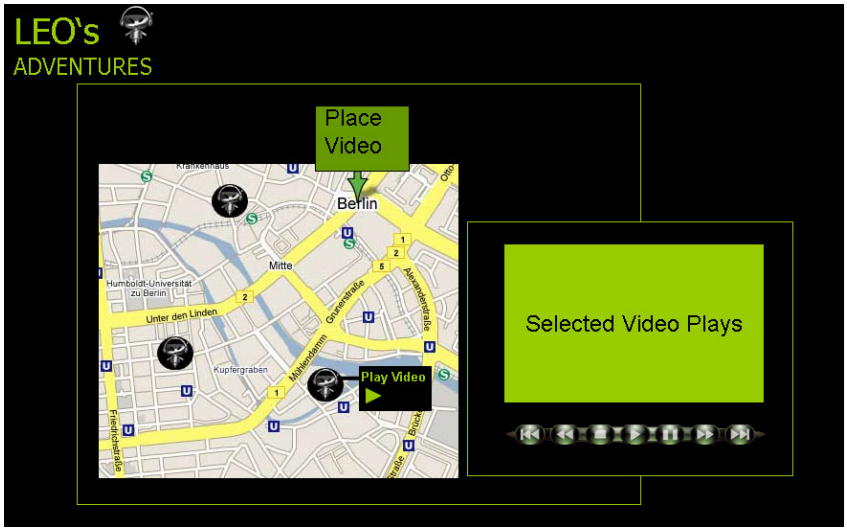


Figure 17: Geographical Browsing

4.2.9 Specification

Hardware and OS	• Computer (MAC as well) with Internet Access, OS independent • Possibility to record own videos (e.g. video camcorder and required capture equipment to digitize video material – which can either be a low cost camera with just a USB/FireWire connection or professional equipment with hardware encoder etc.) • Public web server running the Hyper Media Database (HMDB)
Software	• Web Browser • Installed Adobe Flash™ plug-in (at least 9.x) • HMDB as storage solution running somewhere at the world wide web
Core Features	Easy to use and easy to access video content creation tool based on usual Web2.0 applications. Users are able to upload their videos to a Hyper Media Database (HMDB) Users are able to Animate their videos and provide them with 3D animations (of LEO) User generated stories will be positioned on a virtual Berlin city map
Status	high fidelity prototype finished first working prototype under development (the first prototype will not be able to store video files in the HMDB)
Intended users	Referring to the press report regarding the JIM-Study 2007 [8] almost a fourth of all teenage internet users between 12 and 19 years take part in active Web2.0 usage. At least several times a week they are producing own content either in the form of pictures, videos, music-files or by composing blog entries and newsgroup articles. Exactly this group of internet users, also called teenagers, is the group of users we are supposed to address with “LEO’s Adventures” content creation tool.
Research Workpackages	WP3 Sabiha please fills this… WP4&5 interfaces to the HMDB as a central storage solution as well as for the content creation and for the content browsing tool are obligatory. For positioning stories around a city on a virtual map AuthOr integration is planned.

4.2.10 Leo’s Adventures Mobile Content Browsing Tool

As outlined above city tales has been split-up into content creation and content browsing solutions. In order to browse user generated content of “Leo’s Adventures” a mobile

browsing tool is on development. Furthermore are both the content creation and the content browsing tool connected to a metainformation file system implemented with MySQL [11] database called Hypermedia Database (HMDB) [12] developed by the University of Oulu in Finland. Latest Version supports ATOM protocol [14] [13] for controlling.

However the Leo's Adventures browsing solution is based on traditional AR solutions and City Tales worked closely with WP4 and WP5 to implement a state of the art AR content browsing solutions using a computer vision tracking solution.

Figure 18 illustrates the implemented solution from a high level. (1) The GPS component continuously sends GPS-Data to the Open Tracker component. Open Tracker (2) provides the event component with data about the actual position. If the user reaches a point of interest (POI) the event component is querying (3) the hypermedia database (HMDB) about material with reference to the actual position and presents a list of available videos to the user. (4) Based on users selection the content is provided to the streaming component. (5)(6) Open Tracker receives computer vision tracking (CVT) information from the CVT component and sends combined tracking information back to the streaming component. (7) Video content is superimposed on camera picture (the real environment) and presented to the user (8). Deliverable D4.2 and D5.2 provide some more details on described component.

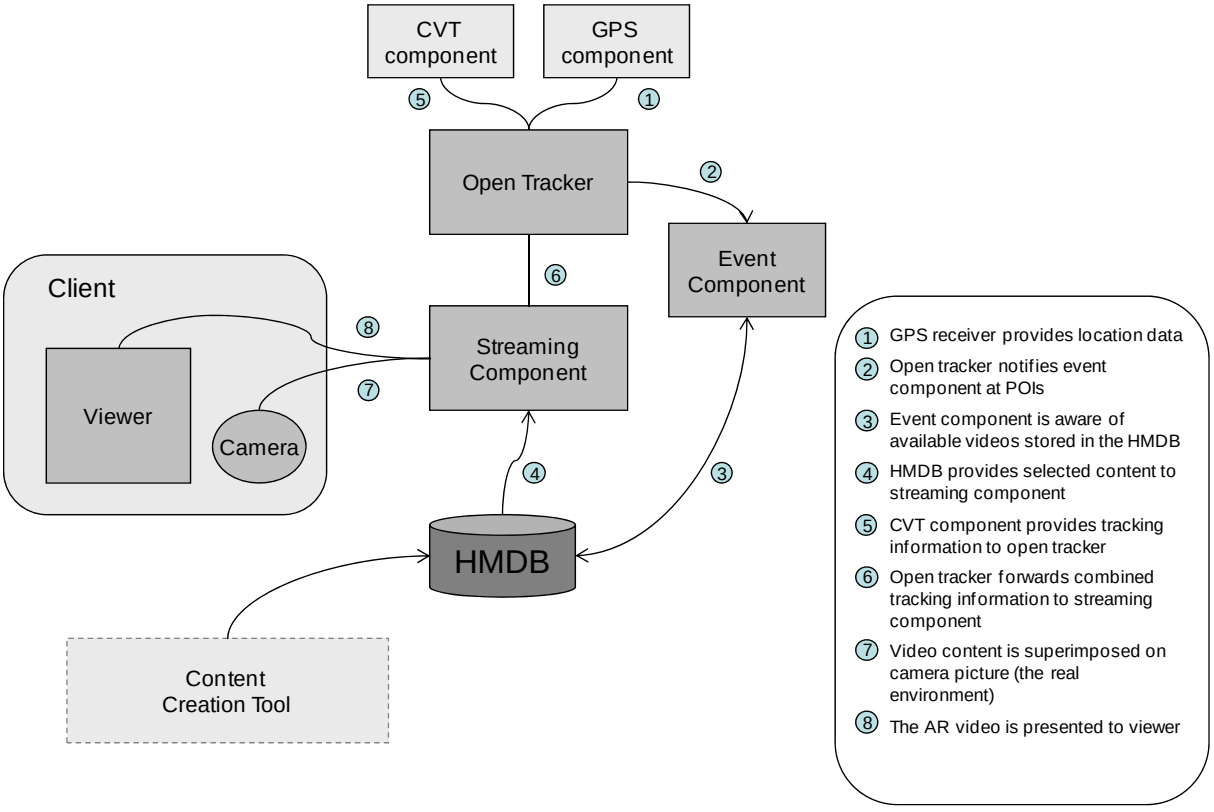


Figure 18: Leo's Adventures Browsing Solution

After a detailed platform research, see appendix A. The Sony Vaio UX1XN was selected as prototype device because it meets the imposed criterions and offers enough of required processing power for Studierstube (STB) framework (see 4.2.16). The Sony Vaio UX Micro PC is an Ultra-Mobile PC (UMPC) that weighs around 490-544g (1.20-1.27 lbs) with a hardware QWERTY keyboard, Touch screen, Intel Core Solo processor, about 1GB of memory, Bluetooth and WiFi (b/g). Delivered with Windows Vista OS and build front and rear camera, the UX seems to be an optimal prototype device.

4.2.11 Early Prototypes

Togehter with TU-Graz and University of Aalbourg two early prototypes for evaluation purposes where created. Based on these prototypes the technology and client for Leo's Adventures content browsing tool were selected.

Computer vision tracking prototype (Aalbourg)

In collaboration with Giang Phuong Nguyen from the University of Aalbourg we developed a CVT based prototype which recognizes and compares images from buildings and returns metainformation stored in a database about. Designed as a stand alone application it would not fit our requirements for Leo's Adventures content browsing tool but for evaluation purposes it provided a lot of information for later hard- and software requirements.

Studierstube prototype (TU-Graz)

During a three day workshop meeting at the ICG Graz University of Technology an early prototype for the Sony UX device, which will be used later as development platform, was created. The aim of this prototype was to find out how videos can be streamed with Studierstube and which file format will be required for footage material. The first prototype was able to switch between different video files, play, stop, and pause them. The video plane is superimposed on the real environment for playback.

4.2.12 Sketching Prototype

The low fidelity prototypes have been created as Photoshop files and entail the functionality outlines in the use cases.

Figure 19: Computer Vision Tracking example on a S-Bahn sign in urban environment

4.2.13 Task Scenario

Mario the 19 years old pupil finished uploading, animating and locating his video recorded on Potsdamer Platz to Leo's adventure web interface. He tells one of his friends to watch the story online and additionally Tim, another friend which is in possession of an ultra mobile PC (UMPC), to go to the Potsdamer Patz and watch the story there. The only thing Tim has to do first is to download software to his UMPC which allows him to watch mixed reality (MR) videos with his device.

4.2.14 Use Scenario

Tim is looking for the Leo's adventure browsing software for his UMPC on the internet. He downloads it at the City Tales webpage. An installation routine assists him during the software installation and configures the device for MR applications usage. The only thing Tim need to watch the MR content in urban devices is an additionally GPS receiver connected to the UMPC either wired with USB, or wireless with Bluetooth. Now Tim's device fits the requirements for the MR content browsing tool.

4.2.15 Essential Use Case

The essential use case for the content browsing tool entails a scenario which our user Tim has to pass through in order to watch the MR content, created by his friend Mario, in urban environment.

User Action	System Response
Tim aims the Device on urban environment.	Shows the environment on display through the internal camera.
Tim targets a spot if interest (U-Bahn or S-Bahn sign)	Through natural feature tracking the application recognises such spots and offers stored videos for the recent identified place.
Tim selects available video for play-back.	Locates and plays the selected video on the screen. Afterwards the application returns to starting point (environment is shown on the display)
Tim continues aiming the device on urban environment watching out for other stories.	Shows the environment on display through the internal camera.

4.2.16 Specification

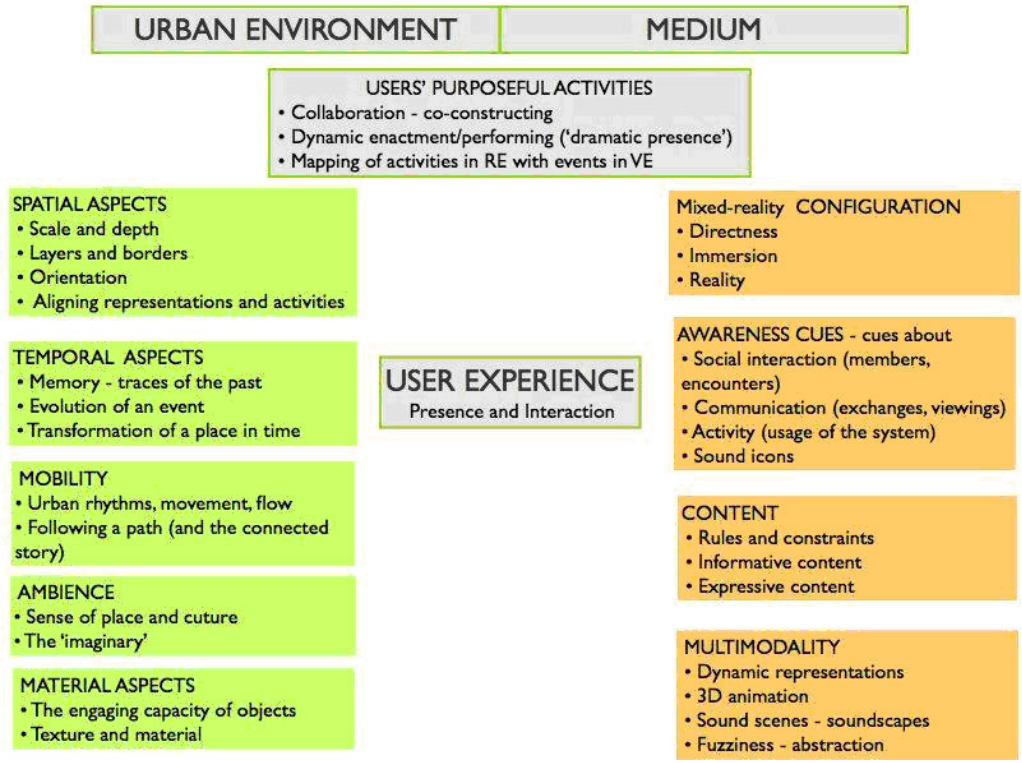
Hardware and OS	• Windows is not necessarily required, many Studierstube functionalities and libraries are also available on Linux platform. Because of some special

	dependencies (DirectX SDK, Windows SDK) our development platform is Windows (rather Vista on UXNX device). • minimum system requirements: o not exactly defined but the weakest devices running Studierstube (with AR Stuff) properly is a Sony UX Handheld device with a Intel Core Solo U1400 1,2GHz (TUGraz) • Camera (either build-in or USB attached Cams required) • Studierstube Framework installed (with all dependencies)
STB	Studierstube (STB) [9] extends the scene-graph rendering library Open Inventor [15] and allows developing augmented reality (AR) applications either in C++ or via Open Inventor script language. The used Open Inventor implementation is Coin3D [15]. Developed by the Graz University of Technology and released under GPL [17], STB is an ideal framework for rapid prototyping of AR applications. Read "The Studierstube augmented reality project" [9] for more accurate and technical description. •
CVT	Computer Vision Tracking (CVT) respectively natural feature tracking is one of the main technologies which is used for the content browsing tool. CVT describes a procedure with which it is possible to get exact tracking data such as ARToolkitPlus [18] provides. Due to the scalability of STB respective OpenTracker [10] it is very easy to change tracking systems without any major programming expenses. OpenTracker requires no specific tracking solution at all. •
Software	• Studierstube (STB) o ARTookit+; DSVL; OT; OV; STB Kernel; TinyXMLMod (TUG modified version of TinyXML) • STB dependencies (external libraries) o ACE; Boost; Coin3d; DirectXSDK (for streaming videos); GLEW; OpenCV; QT; Simage; SoWin; WindwosSDK
Core Features	Access user generated videos positioned within a defined area by users with the content creation tool. The video frames will be added into the real world, for e.g. overlaid on urban signs, by several tracking technologies.
Status	Early prototype under development. The first version will not provide a computer vision tracking (CVT) feature.
Intended users	Information regarding the intended audience please see the content creation tool specification table on column "Intended

	users" 4.2.9 page 9.
Research Workpackages	WP3 Concept Map, alignment of 3D animation principles and the IPCity concept map. WP4&5 The Studierstube (STB) framework developed by the Graz University of Technology is used for creation. For central storage solution the Hypermedia Database (HMDB) is used.

4.3 Presence / Approach/ Relevance

As outlined in section 3.5 of this document we focused on conceptualizing the performative aspects of presence in order to create the 3D content necessary for the user generated mixed reality creation too. However, in addition Leo's adventures utilizes a number of presence aspects that are outlined below.

WP3 Presence Concept Map	 *Figure 20 : Leo's Concept Map*
Multimodality	In order to successfully develop a virtual character for a real environment a number of multimodality issues have to be addressed. It has to be ensured that 3D animation fit into a real environment e.g. building stand on the group and do not hover above it and movements have to take the environment into consideration e.g. an animation of a car should not be able to drive through a tree. The results of the city tales research therefore suggested to extend the concept map to cater for the new dimensions of multimodality aspects of presence.
Con-construction of Presence	The simple MR user created content application is aiming to create a novel form of con-construction of presence. The fact that the user will actually create MR content on a PC that he/she will be able to lock at later in an urban environment with a special AR window, see section 3.4.1. which provides us

	with a prove of concept that end users themselves are capable of creating complex MR stories with simple tools.
Social Aspects	The end user will be able to use a know medium (video) to create a MR content and we hope that this will enable the user to create social relevant content. Since we have only conducted peer studies so far this still has to be proven.
Temporal Aspects	The user will be free to add and video content for MR content creation but it will be encouraged to upload urban stories and by mixing the real world (video) with the virtual (3d animation) there are no limits set to mobility etc.
User Interface	The main emphasis of WP9 is on simplification of the user interfaces in order to enable the largest possible number of users. One of the biggest challenges of Leo's Adventures is to create a meaningful and simple UI that will afford animating the character and placing it at an urban space. A complex User study will have to be conducted to enable this.
Peer Studies	In order to evaluate our initial web designs with a main emphases on explorative usability study we organized a peer study with 3 individuals: Nina Dautzenberg Freelance Graphic Designer: *"…Leo is a likeable character and the initial drafts a clear and easy to understand and I can see how a certain clientele would use such an interface but I believe you will struggle to enable meaningful animation on videos…"* Steffen Harrer Freeland 3D Animator *"… Less complex animations would be necessary to enable an easy merge of video material with 3D animations"* Neving Aladag video Artist *"…this is a intriguing idea an a bold and unpretentious approach to presence. The appliance will be difficult but I am certain you will be rewarded with a well worth it proof of concept."*
Conclusion	The actual animations and User interface designs was mainly well judged by the invited experts. Based on the feedback of the 3D animator we adjusted the animations to feature less complex movements. The main point raised was that the ability to actually merged video and 3d animations on a simple web client was a innovative idea but that it will be a difficult task. After this initial peer study that gave us some insight in the usability we will organize a focus group with 10-20 users before we will take an attempt to publishing the client.

5 Dissemination

The main dissemination plans of the phase 2 of the city tales project was focuses on scientific publications. Below a list of accepted and planned publications:

5.1 Accepted Publications

- McCall, R., Ghellal, S., and Rothauer, J.. Mobile Phones, Subculture and Presence. Workshop on Mobile Spatial Interaction. CHI 2007, San Jose USA.
- McCall, R. Mixed Reality: Life on the Streets. KEHO Newsletter (Peach CA Ezine). www peachbit.org

5.2 Planned Posters

- Ghellal, S., McCall, R., Ohlenburg, J., and Harrer, S.. 12 Mixed Reality Principles of Animation – Based on Disney's Principles of Animation. Computer/Human Interaction Conference. CHI2008, Florence ITALY.

5.3 Planned Publications

- McCall, R., Ghellal, S., and Rothauer, J.. Measurement Techniques for Assessing Presence on Cultural Tours. Mobile HCI 2008
- McCall, R. ., Ghellal, S., and Rothauer, J. "Where am I?": Content and Presence on Mobile Phones. BCS HCI or Mobile HCI

6 Appendix A

6.1 Platform Research

In March 2007 WP9 invited to an initial technical workshop in Berlin to discuss relevant topics such as platform specification and minimum requirements. Representatives of WP4 and WP4 attended the meeting in Berlin.

City Tales concentrates on the human-computer interaction (HCI) aspects of mixed reality (MR) and presence. Development objective are to create easy to use and easy to understand interfaces which as well meet the needs of non technical users. Main aim is to support users in producing and browsing MR content. Users will be allowed to experience own or by other users created MR stories.

To meet the needs of non technical users some specific guidelines where elaborated:

- Use an existing and known medium to encourage mixed reality story telling.
- Create simple user interfaces with few options
- Necessity to trivialize AR technology and presence science in order to create main stream prototypes.
- Create simple browsing technologies based on hardware available on the market
- Do not intimidate users by using modern hardware as this may distract them from their actual tasks.
- Create a trusting and warm atmosphere in which the users feel comfortable to tell their stories.

The early prototype is planned as a flash client similar to well known Web 2.0 portals like YouTube and My Video (see 4.2.1). Users neither have to afford expensive hardware nor have they to understand how to use complex hardware. Only a computer with connection to the internet and installed flash plug-in, which is available for nearly every web browser, is required.

As part of the performed research a decision on used platform/device had to be made. See below the elaborated minimum specification requirements.

- Screen size: min 3 inch
- Resolution: min 320x240px
- Processing power: min. ~600 MHz
- Graphic acceleration: should have
- Operating system: Windows Mobile 5 (or similar)
- Build in camera: should have
- Bluetooth: must have
- GPS: either USB of via Bluetooth
- WiFi: nice to have

6.2 Researched Devices

The following table shows a list of researched devices for the Leo's Adventures mobile content browsing tool. The list was created as a result of the platform research from March 2007 in Berlin.

<table>
<tr><td>Nokia N800 Internet Tablet</td><td>

Price: ~400 EUR
SPECIFICATIONS:
128MB RAM 256MB ROM , 7" 800 x 480 TFT, 802.11b/g, Bluetooth, 1 x USB 2.0, Int. Speaker and Microphone, Fold-out able Camera, Dimensions: 14,4x7,5x1,3 cm (WDH), Weight: 206 g
Software:
Linux (Internet Tablet OS Edition 2007)

Figure 21: Nokia N800 Internet Tablet
</td></tr>
<tr><td>Dell Axim x51v Pocket PC</td><td>

Price: ~450 EUR
SPECIFICATIONS:
Intel® XSclae™ PXA270 625MHz, Intel® 2700G 16MB, 64MB RAM 256MB ROM , 3,7" 480x640 TFT, 802.11b/g, Bluetooth, Int. Speaker and Microphone, ,SD/MMC Slot, Dimensions: 7,3x11,9x1,6 cm (WDH), Weight: 175 g
Software:
Windows Mobile 5

Figure 22: Dell Axim x51v Pocket PC
</td></tr>
<tr><td>Sony Ericsson P990i</td><td>

Price: ~440 EUR
SPECIFICATIONS:

</td></tr>
</table>

	ARM9 168 MHz, 3,7" 240x320, Bluetooth, Memory Stick Duo, Camera 2Mp, Dimensions: 11,4x5,7 cm (LW), Weight: 155 g • **Software:** Symbian v9.1, UIQ 3.0  *Figure 23: Sony Ericsson P990i*
Sony Playstation Portable	• **Price: ~340 EUR** • **SPECIFICATIONS:** ~333MHz, 32MB Main Memory 4MB Embedded DRAM, 4,3" 480x272 TFT, 802.11b, Int. Stereo Speaker, IrDA, USB 2.0,Memory Stick PRO Duo Slot, Dimensions: 17x7,4x2,3 cm (LWD), Weight: 260 g • **Software:** Proprietary  *Figure 24: Sony Playstation Portable*
Sony Vaio UX1XN	• **Price: ~3.000 EUR** • **SPECIFICATIONS:** Intel Core Solo U15000 1,33GHz, 1GB Main Memory, Intel GMA 950 (128MB Shared RAM), 4,5" 1.024x600 TFT, 802.11b/g, Fingerprint reader, USB 2.0 ,Memory Stick PRO Duo Slot, front and back camera, Dimensions: 15x9,5x3,8 cm (WDH), Weight: 490 - 544g • **Software:** Windows Vista

Figure 25: Sony Vaio UX1XN

References

[1] Laura Ermi and Frans Mäyrä "Fundamental Components of the Gameplay Experience:1 Analysing Immersion" (DiGRA 2005 Conference: Changing Views – Worlds in Play, 2005)

[2] Relph, E. (1976). *Place and Placelessness*. Pion Books,London.

[3] Tapscott D.(2007) “How Mass Collaboration Changes Everything”

[4] Stiehl,W. & Breazeal, C. (2005), “Design of a Therapeutic Robotic Companion for Relational, Affective Touch,” Proceedings of Fourteenth IEEE Workshop on Robot and Human Interactive Communication (Ro-Man05), Nashville, TN.

[5] Mobile Spatial Interaction Workshop Whitepaper

[6] Freeman, D. (2003). Creating Emotion in Games: The Craft and Art of Emotioneering. Indianapolis (Ind.): New Riders

[7] MMAPI – Mobile Media API (JSR-135), URL: http://java.sun.com/products/mmapi/, last visited 2006-09-28

[8] Medienpädagogischer Forschungsverbund Südwest (mpfs) (2007): Jugendliche machen mit bei Web 2.0: Erste Ergebnisse de r JIM-Studie 2007 veröffentlicht Stuttgart: http://www.mpfs.de/fileadmin/images/PM_mpfs_03_JIM07_Web2.0.pdf. Checked 2007-10-25.

[9] Schmalstieg, D., Fuhrmann, A., Hesina, G., Szalavari, Zs., Encarnacao, L. M., Gervautz, M., & Purgathofer, W.¸ The Studierstube augmented reality project. PRESENCE - Teleoperators and Virtual Environments, 11(1)

[10] Reitmayr, G., & Schmalstieg, D., OpenTracker - an open software architecture for reconfigurable tracking based on XML. Proceedings of IEEE Virtual Reality 2001, pages 285-286, Yokohama, Japan, 2001.

[11] MySQL open source database, http://www.mysql.com/. Checked 2007-11-01

[12] Hypermedia Database (HMDB), http://www.ipcity.eu/hmdb/doku.php. Checked 2007-10-31

[13] APP, http://ietfreport.isoc.org/idref/draft-ietf-atompub-protocol/. Checked 2007-10-31

[14] ATOM, http://ietfreport.isoc.org/idref/rfc4287/. Checked 2007-10-31

[15] SGI OpenInventor, http://oss.sgi.com/projects/inventor, http://doc.coin3d.org/. Checked 2007-10-31

[16] Adaptive Communication Environment, http://www.cs.wustl.edu/schmidt/ACE.html. Checked 2007-10-31

[17] General Public License, http://www.gnu.org/licenses/gpl-3.0.html. Checked 2007-11-16

[18] ARTookitPlus, http://studierstube.icg.tu-graz.ac.at/handheld_ar/artoolkitplus.php. Checked 2007-11-16

[19] Tuan,Y.-F. *Space and Place*. Minneapolis: University of Minnesota Press. (1977).

[20] Gustafson, P. Meanings of Place: Everyday experience and theoretical conceptualizations. Journal of Environmental Psychology 21. (2001). p5-16

[21] Benyon, D. Smyth, M., O’Neill, S., McCall, R. andCarrol, F. *The Place Probe: Exploring a Sense of Place in Real and Virtual Environments*. Journal of Presence: Tele-operators and Virtual Environments. 15, 6, (2006) p668-687.

[22] Vorderer, P., Wirth, W., Gouveia, F. R., Biocca, F., Saari, T., Jäncke, F., Böcking, S.,Schramm, H., Gysbers, A., Hartmann, T., Klimmt, C., Laarni, J., Ravaja, N.,

Sacau, A*., Baumgartner, T., & Jäncke, P. MEC Spatial Presence Questionnaire (MEC-SPQ): Short D*ocumentation and Instructions for Application. Report to the European Community*, Project Presence: MEC (IST-2001-37661). (2004). Online. Available from* http://www.ijk.hmt-hannover.de/presence

[23] Benjamin, W. (1968) “Art in the Age of MechanicalReproduction.” In Illuminations. Schocken Books, New York, pp. 217–251.

[24] MacIntyre, B., Bolter, J.D., Gandy, M. (2004) Presence and the Aura of Meaningful Places. In the Proceedings of the 7th Annual International Workshop on Presence, p28-35

Acknowledgements and Further Information

IPCity is partially funded by the European Commission as part of the sixth framework (FP6-2004-IST-4-27571

For further information regarding the IPCity project please visit the project web site at:

ipcity.eu