



**Integrated Project on Interaction and Presence
in Urban Environments**

FP6-2004-IST-4-27571

ipcity.eu

Evaluation Summary Report Year 2
Deliverable D1.8



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Abstract

This document serves several purposes. First, it provides an overview on how the project performed against the success indicators defined by the consortium. This allows measuring the project's success for project members, its individual boards, the EC, and the project reviewers. Second, it provides a good overview of the results and their quality, which may be interesting for other (similar) projects or projects doing research in related areas.

This report is structured as follows: The first section introduces the overall quantitative and qualitative indicators for measuring progress and impact of work. The second section provides more specific measurement criteria for the individual research and showcase work packages. Finally, section three deals with management assessment .

Revisions in Response to Review Report

Compared to last year's version of the report, the individual measurements have been revised and clarified. Individual indicators and methods to collect the data required were applied as defined in the revised Deliverable 1.2.

1 General Progress and Success Indicators

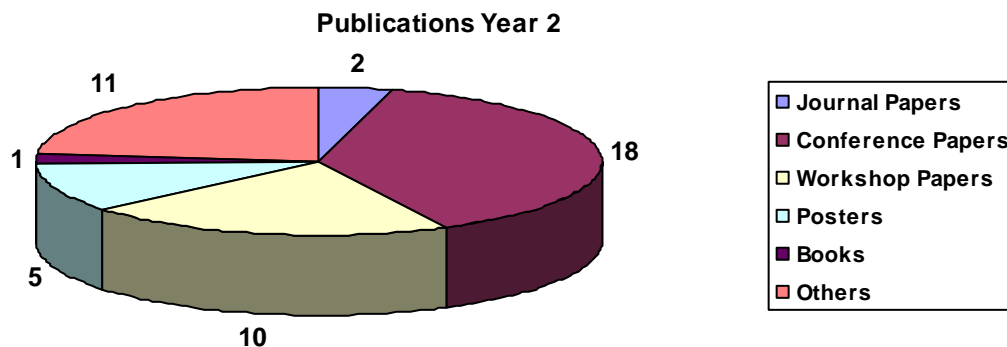
This section will list the qualitative and quantitative indicators used to measure and monitor the overall success and impact of the project.

1.1 Quantitative Indicators

The following quantitative indicators will be used for reporting on progress with the implementation of its research plan by the consortium:

1.1.1 Publications and presentations

The section lists the individual and joint publications directly related to the work undertaken within the contract (conferences, journals, magazines, etc.)



Journal publications

Jacucci, G., Wagner, I., (2007). Performative Roles of Materiality for Collective Creativity, Leonardo Journal, Special Issue. (accepted, pending publication)

Gerhard Schall , Erick Mendez , Ernst Kruijff , Eduardo Veas , Sebastian Junghanns , Bernhard Reitinger, Dieter Schmalstieg, Handheld Augmented Reality for Underground Infrastructure Visualization, ACM Personal and Ubiquitous Computing Journal, 2008

Conference papers

Reitinger, Bernhard, Zach, Christopher, Schmalstieg, Dieter (2007). „Augmented Reality Scouting for Interactive 3D Reconstruction”. In *Proc. of IEEE Virtual Reality 2007 Conference (VR 2007)*, March 10-14, 2007 (Charlotte, NC, USA), IEEE, Piscataway, NJ, USA, 2007, 219-222.

Wagner, Schmalstieg (2007). “Middleware for Prototyping Mixed Reality Multiuser Games”. In *Proc. of IEEE Virtual Reality 2007 Conference (VR 2007)*, March 10-14, 2007 (Charlotte, NC, USA), IEEE, Piscataway, NJ, USA, 2007, 235-238.

Dachselt, R., Figueroa, P., Lindt, I., and Broll, W.: “Mixed Reality User Interfaces: Specification, Authoring, Adaptation”. In *Proc. of IEEE Virtual Reality 2007 Conference (VR 2007)*, March 10-14, 2007 (Charlotte, NC, USA), IEEE, Piscataway, NJ, USA, 2007, 324-325.

Basile, M. Bourdin A., « Transformations des usages de la ville : TIC et utilisation des technologies de la réalité augmentée ». Hyperurbain : Technologies de l'Information et de la Communication en milieu urbain : quel impact sur la ville sociale ? », Université de Paris 8, 29 March 2007

Wittkämper, M., Ohlenburg, J., Lindt, I., Herling, J., Broll, W., and Ghellal, S.: „Exploring Augmented Live Video Streams for Remote Participation“. ACM Computer Human Interaction 2007 (CHI 2007) (San Jose, California, April 28 - May 3, 2007), In *Proc. CHI '07*

extended abstracts on Human factors in computing systems, ACM, New York, 2007, 1881 - 1886.

Basile, Maria. « IP City : la réalité mixte au service du débat dans le projet urbain », SCAN'07 séminaire de conception architecturale, Université de Liège, 10 May 2007

Juustila, A., Räisänen, T. "Atelier Infrastructure for Ubiquitous Computing". Tiainen, Tarja, Isomäki, Hannakaisa, Korpela, Mikko, Mursu, Anja, Paakki, Minna-Kristiina, and Pekkola, Samuli (Eds.) (2007), Proceedings of 30th Information Systems Research Seminar in Scandinavia, IRIS30 (11.-14.8.2007, Murikka, Tampere, Finland), Department of Computer Sciences, University of Tampere, Finland, Series of Publications: D - Net Publications D-2007-9, September 2007, <http://www.cs.uta.fi/reports/dsarja/> 1330 pages. ISBN 978-951-44-7048-6, ISSN 1795-4274.

Ohlenburg, J., Broll, W., and Lindt, I.: "DEVAL – AR/VR Device Abstraction Layer Implementation", in *Proc. of the 12th International Conference on Human Computer Interaction (HCI International 2007), 4th International Conference on Universal Access in Human-Computer Interaction (UAHCI 2007)*, Beijing, China, July 22-27, 2007, by Springer, Berlin (2007), Lecture Notes in Computer Science (LNCS), Vol. 4554, 497-506.

Sareika, Markus, Schmalstieg, Dieter (2007) "Urban Sketcher: Mixed Reality on Site for Urban Planning and Architecture". In Proceedings, "6th International Symposium on Mixed and Augmented Reality", Nara, Japan, November 2007 pp. 27-30., IEEE, ACM, 2007

Maquil, Valérie, Psik, Thomas, Wagner, Ina, Mira Wagner (2007) "Expressive Interactions Supporting Collaboration in Urban Design". In: *Proceedings of GROUP 2007*, Nov 4 - 7, Sanibel Island, Florida, USA

Katharina Garbe, Iris Herbst, Jens Herder. (2007). "Spatial Audio for Augmented Reality". In *Proc. of Human and Computer 2007 (HC2007)*, pp. 53-58, Düsseldorf/Aizu-Wakamatsu/Tokyo, 13-15 Dec, 2007

Peltonen, P., Salovaara, A., Jacucci, G., Ilmonen, T., Ardito, C., Saarikko, P., Batra, V. "Semi-public displays for small, co-located groups". In Proc MUM 2007, ACM Press (2007), New York, 131–138.

Kujanpää T., Manninen T. & Vallius L. (2007) „What’s My Game Character Worth – The Value Components of MMOG Characters“. In Akira, B. (Ed.) *Situated Play – Proceedings of the DIGRA 2007 conference*, University of Tokyo, pp. 327-334

Jacucci, G., Oulasvirta, A., Ilmonen, T., Salovaara A., Evans, J., "CoMedia: Mobile Group Media for Active Spectatorship". In Proceedings of the SIGCHI conference on Human factors in computing systems, ACM, 2007, pp. 1273 – 1282.

Maquil, Valérie, Psik, Thomas, Wagner, Ina (2008) "The ColorTable – A Design Story". ACM Tangible and Embedded Interaction 2008, Bonn, February 18 and 21, 2008 (forthcoming).

Wolfgang Broll, Jan Herling, Lisa Blum. "Interactive Bits: Prototyping of Mixed Reality Applications and Interaction Techniques through Visual Programming". To appear in proc. of IEEE Symposium on 3D User Interfaces 2008 (IEEE 3DUI 2008). (Reno, Nev., USA, March 8-9, 2008) IEEE Computer Society, Piscataway, NJ, USA.

Peltonen, P., Kurvinen, E., Salovaara, A., Jacucci, G., Ilmonen, T., Evans, J, Salovaara, A, Oulasvirta, A. "'It's Mine, Don't Touch!': Interactions at a Large Multi-Touch Display in a City Center' to appear in proc. of ACM Computer Human Interaction 2008 (CHI 2008) (Florence, Italy, April 5 – 11, 2008), ACM press.

McCall, R, Kuutti, K., Wagner, I. & Jacucci, G. (2008) "Urban Mixed Realities - Technologies, Theories and Frontiers". ACM Computer Human Interaction 2008 (CHI 2008) Extended abstracts proceedings.

Workshop papers

Irschara, C. Zach, H. Bischof. „Towards Wiki based density matching”. Proceedings of the Eleventh IEEE International Conference on Computer Vision, Workshop on Virtual Representations and Modeling of Large-scale environments (VRML), 2007

Pirchheim, Schmalstieg, Bornik (2007). “Visual Programming for Hybrid User Interfaces”. *Proceedings of the Second International Workshop on Mixed Reality User Interfaces 2007 (MRUI'07)* at IEEE Virtual Reality 2007 (VR 2007), (Charlotte, NC, USA, March 10, 2007), Shaker Verlag, Aachen, 25-32.

Newman Joseph, Bornik Alexander, Daniel Pustka, Florian Echtler, Manuel Huber, Schmalstieg Dieter, „Tracking for Distributed Mixed Reality Environments”, Proceedings of IEEE Virtual Reality Workshop on Trends and Issues in Tracking for Virtual Environments, Charlotte NC, USA, 2007-March.

Juustila, Antti; Kangas, Tanja; Räisänen, Toni; Kuutti, Kari; Soudunsaari, Leena (2007). “Bringing Urban Design Site to Studio by using a Remote Surveillance Camera”. Workshop paper in: CHI 2007. Imaging the City, Exploring the Practices & Technologies of Representing the Urban Environment in Human-Computer Interaction. 25th International Conference on Computer-Human Interaction, San Jose, California, U.S.A., 28 April-3 May, 2007. See: <http://www.andrew.cmu.edu/user/cdisalvo/chi2007workshop/papers.html>

Schall, Gerhard, Mendez, Erick, Reitinger, Bernhard, Junghanns, Sebastian, Schmalstieg, Dieter (2007). „Mobile Geospatial Augmented Reality using Urban 3D Models”. Workshop on Mobile Spatial Interaction (in conjunction with ACM CHI '07), 2007.

Rod McCall, Sabiha Ghellal, Joachim Rothauer (2007). “Mobile Phones, Sub-Culture and Presence”. ACM Computer Human Interaction 2007 (CHI 2007) Workshop on Urban Mobile Spatial Interaction (San Jose, USA, April 28th – May 3rd, 2007).

G.P. Nguyen, H.J. Andersen, and M.F.Christensen (2008). “Urban building recognition during significant temporal variations”. IEEE 2008 Winter Vision Meetings, Workshop on Application of Computer Vision .

McCall, R., Herbst, I., Braun, A., and Wetzel R. (2008). “The “Where” of Mixed Reality: Some Guidelines for Design”. ACM Computer Human Interaction 2008 (CHI 2008) Workshop on Urban Mixed Realities - Technologies, Theories and Frontiers (Florence, Italy, April 5 – 11, 2008).

Jan Ohlenburg, Wolfgang Broll, Irma Lindt (2008). „Orchestration and Direction of Mobile MR Games”, accepted for. ACM Computer Human Interaction 2008 (CHI 2008) Workshop on Urban Mixed Realities - Technologies, Theories and Frontiers (Florence, Italy, April 5 – 11, 2008).

Sareika, Markus, Schmalstieg, Dieter (2008). “Urban Sketcher: Mixing Realities in the Urban Planning and Design Process”. ACM Computer Human Interaction 2008 (CHI 2008) Workshop on Urban Mixed Realities - Technologies, Theories and Frontiers (Florence, Italy, April 5 – 11, 2008).

Posters

McCall, R. (2007) “Using evolving histories to enhance place and presence”, Pergames 2007. Salzburg, Austria.

Iris Herbst, Sabiha Ghellal, Anne-Kathrin Braun: “TimeWarp: An Explorative Outdoor Mixed Reality Game”, SIGGRAPH 2007. Accepted as poster, published in *DVD Proc. of ACM SIGGRAPH 2007, 34th International Conference on Computer Graphics and Interactive Techniques* (San Diego, USA, Aug. 5-9, 2007), ACM, New York, 2007.

Iris Herbst, Anne-Kathrin Braun, Rod McCall, Wolfgang Broll: “Interactive City Exploration through MR”, IEEE VR 2008. Accepted as poster, to appear in *proc. of IEEE Virtual Reality 2008 (IEEE VR 2008)*. IEEE Computer Society, Piscataway, NJ, USA.

Katharina Garbe, Iris Herbst (2008). "Extending X3D with Perceptual Auditory Properties". Accepted as poster, to appear in *proc. of IEEE Virtual Reality 2008 (IEEE VR 2008)*. IEEE Computer Society, Piscataway, NJ, USA.

Sabiha Ghellal, Rod McCall, Jan Ohlenburg, Steffen Harrer (2008). "12 Mixed Reality Principles of Animation – Based on Disney's Principles of Animation". Accepted as poster for. ACM Computer Human Interaction 2008 (CHI 2008) Workshop on Urban Mixed Realities - Technologies, Theories and Frontiers (Florence, Italy, April 5 – 11, 2008).

Books

Dachselt, R., Figueroa, P., Lindt, I., and Broll, W. (eds.): *Proceedings of the Second International Workshop on Mixed Reality User Interfaces 2007 (MRUI'07)* at IEEE Virtual Reality 2007 (VR 2007), (Charlotte, NC, USA, March 10, 2007), Shaker Verlag, Aachen.

Others

Peltonen, P. CityWall. A presentation at the annual Conference of Finnish Social Psychologists in Tampere, 2007.

McCall, R. (2007). Mixed Reality: Life on the Streets. KEHO. Issue 2, Autumn 2007.

McCall, R. (2007) From San Jose to Salzburg. Interfaces. British Computer Society. Issue 72, Autumn 2007.

McCall, R. (2007).Virtual Reality Grows Up Interfaces. British Computer Society. Issue 73, Winter 2007.

Kuutti K. (2007) IPCity – Augmenting Urban Space with Technology. Presentation in the workshop on New Technologies for Urban Participartion. Musahsi Institute of Technology, Yokohama March 2007

Basile, M. Terrin, JJ .IPcity: les technologies de réalité augmenté et la ville. Presentation at the seminar of LTMU/Université de Paris 8, France, 27.04.2007

Basile, M. Terrin, JJ. .IPcity: La réalité augmentée au service d'acteurs de la ville. Presentation at the annual seminar of CNRS-UMR. 19.06.2007

Terrin, JJ.: Negotiating the city. Conference in the festival *Draussen in der Stadt*, in Vienna 04.10.2007

Basile, M.: IPcity: les technologies de réalité augmenté et les acteurs de la ville. Presentation at the seminar of MRTE/Université de Cergy-Pontoise, France, 27.11.2007

Terrin, JJ. Les technologies de la réalité mixte et le projets urbain. Presentation at the Ecole d'architecture de Versailles. 09.12.2007

Terrin, JJ. : IPcity project. Presentation at the Ecole des Ponts et Chaussées, Master Amur, France. 11.12.2007

Citation index

Within the previous working period the following results regarding the number of citations to project-based publications (conferences, journals, magazines, etc.) were recognized. Based on the Google Scholar and CiteSeer services one of the project related publications published in 2006 have been cited. The number of citations to year 2007 publications is 6.

Organization of workshop and events

During the previous 12 months, the IPCity consortium organized the following workshop and events as well as presentations to external specialist at workshops and conferences.

MRUI'2007 – Workshop on Mixed Reality User Interfaces at IEEE VR 2007. www.mrui2007.org. Workshop co-organizer: Wolfgang Broll. March 11, 2007, approx. 40 participants.

Juhlaviikot.fi - Trial, CityWall in official program of the nights of the arts, also presented in a national newspaper.

Panel Session in Presence 2007 - Urban Mixed Realities: Challenges to the Traditional View of Presence. Panelists: Rod McCall, Ina Wagner, Kari Kuutti, and Giulio Jacucci.

Organisation of a workshop at CHI 2008: McCall, R, Kuutti, K., Wagner, I. & Jacucci, G. (2008) Urban Mixed Realities - Technologies, Theories and Frontiers. ACM Computer Human Interaction 2008 (CHI 2008)

Special issue of Psychology Journal based upon the outcomes of the CHI 2008 workshop.

Press coverage

The list of appearances in public press and television.

WP7: CityWall coverage:

From the city of Helsinki:

<http://www.helsinki.fi/en/index/matkailu/uutiset/2d69988a9c720d6937cd28e1b817db1d.html>

CityWall also appeared in several blogs and news sites:

<http://www.gearfuse.com/citywall-built-this-city-on-social-media/>

<http://votwfrench.wordpress.com/2007/12/05/le-city-wall-a-helsinki/>

<http://www.gwix.net/blog/fr/interface-human-computer/citywall-mobilier-urbain-ecran-multitouch.asp>

<http://digitalexperience.dk/index.php?s=multi-touch>

<http://meneame.net/story/citywall-ejemplo-tecnologia-multi-toque-gran-escala-video>

http://digg.com/design/A_large_multi_touch_display_and_playful_human_engagement

<http://cooing.kr/tag/multi-touch>

<http://mjulia.org.ua/index.php?newsid=1857>

<http://cooing.kr/577>

<http://www.blogarts.net/?2007/08/30/286-city-wall-un-ecran-tactile-pas-comme-les-autres>

<http://blog.jvm-neckar.de/2007/05/29/citywall/>

<http://tw.youtube.com/watch?v=FZ9JvzYec4U>

<http://elias.com/index.php?/archives/4136-CityWall.-ejemplo-de-tecnologia-multi-toque-a-gran-escala.html>

<http://www.limk.com/yorumlar.php?cid=112514>

<http://emeshing.blogspot.com/2007/08/citywall.htm>

http://favoritos.kazulo.com/bookmark/detailfo/cat_id/1/rec/77/citywall.htm

<http://www.bold.cl/blog/?p=620>

<http://www.gearfuse.com/citywall-built-this-city-on-social-media/>

http://people.clarkson.edu/~johndan/workspace/2007/05/citywall_public_collaborative.html

<http://finnmetal.com/blog/?p=146>

<http://www.designerblog.it/post/1395/un-citywall-nel-cuore-di-helsinki>

<http://olkas.blogspot.com/2007/07/citywall.html>

<http://www.xinoxano.com/2007/05/28/citywall-helsinki/>

http://www.medienschmerz.com/2007/05/citywall_helsinki.html

<http://www.flytip.com/blog/?p=1424>

<http://e-spacy.com/blog/citywall-multitouch-technology/>

<http://bumped-heads.blogspot.com/2007/06/citywall.html>

http://www.dailygalaxy.com/my_weblog/2007/05/city_wall_colla.html

<http://www.youtube.com/watch?v=MSC6mPbuQq8>

<http://www.polaine.com/playpen/2007/05/25/multitouch-city-wall/>

<http://ebuzzblog.blogspot.com/2007/10/citywall.html>

<http://www.dirtymouse.co.uk/web/city-wall-helsinki/>

<http://geeksugar.com/472558>

www.digitalexperience.dk/?p=289

<http://sweb.cityu.edu.hk/nmi/2007/07/citywall-multitouch-again.htm>

<http://www.facade.fi/?p=27>

http://people.clarkson.edu/~johndan/workspace/2007/05/citywall_public_collaborative.html

<http://www.stylecrux.com/city-wall-helsinki/>

http://www.tranism.com/weblog/2007/05/the_citywall.html

WP8:

http://www.wdr.de/themen/computer/2/virtuelle_realitaet/070928.jhtml (28.09.2007, wdr online)

<http://www.neuepresse.de/newsroom/medien/art663,111314> (Neue Presse online)

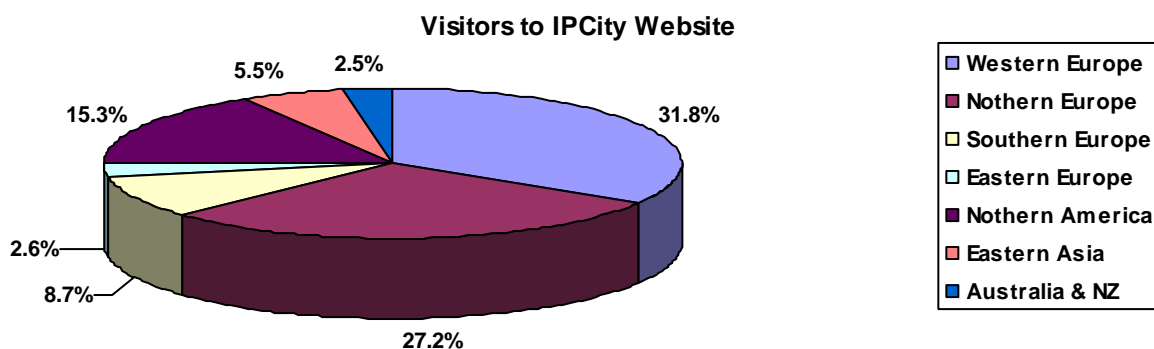
http://www.media.nrw.de/media2/site/index.php?id=73&tx_ttnews%5Btt_news%5D=53719&cHash=7da261f6c4 (21. September 2007, NRW media)

<http://www.wdr5.de/sendungen/leonardo/1008008.phtml> (06.11.2007, WDR5)

1.1.2 Dissemination

Website

The dissemination website at www.ipcity.eu has had 22 740 page views since 15th of March until 31st of December 2007. The tracking and statistics system was taken into use in March. There has been 16 666 unique visitors. Origin of the visitors, not including the areas less than 2 percent of the visitors:



Newsletter

The main channel of delivery of the IPCity news is the News section of the external dissemination website at www.ipcity.eu. The news items are also downloadable by using RSS feeds. The section has currently 561 unique visitors. Additionally, the news items are delivered to a limited number of subscribers by email, but this number is not significant due to the primary news delivery method being the web site.

Contacts with user groups

The number of contacts with relevant users groups whether academic or industrial/commercial

TUG: 5

- Imagination
- Hit Lab
- VRVIS
- ATR Intelligent Robotics and Communication Laboratories, Ibaraki, Japan
- Microsoft Research

OULU: 5

- Department of Architecture, University of Oulu
- University of Art and Design, Helsinki
- Mushashi Institute of Technology, Laboratory of Socio-informational System Design, Yokohama, Japan (prof. Ueno)
- University of Lapland, Dept. Industrial Design, Rovaniemi, Finland (prof. Uotila)
- City of Vaasa, Finland (Mr. Lonka, director of technology)

FIT: 5

- MediaDesign Hochschule Düsseldorf
- GamesAK NRW
- Games Gathering Cologne
- City of Cologne
- Cologne Competence Cluster Virtual Reality

TKK : 7

- Helsinki City Cultural Office
- Eurovision
- Samba Carnival
- Juhlaviikot, Helsinki festival Night of the Arts
- Spectators at events

UMLV: 12

- CiTu/ University of Paris 1- 8
- City on the Move Institute, PSA Peugeot Citroën
- Sainte-Anne Hospital
- Municipality of Paris (Heritage service)

- Ministry of Justice
- Mk2 cinemas
- Library BNF(Bibliothèque National Français), Paris
- LTMU/Université de Paris 8, France
- CNRS-UMR,
- MRTE/Université de Cergy-Pontoise, France
- Ecole d'architecture de Versailles
- Ecole des Ponts et Chaussées : Master AMUR

TUW : 2

- GB16 Urban renewal office, Vienna
- Stadterneuerungsfonds Wien

Sony : 3

- PlayStation Group, European HQ in London UK
- Walkman Group European HQ in London UK
- Sony Internal R&D Departments, CSL Tokio, Paris & Stuttgart

Field trials

The number of field trials and the total number of end-users involved

WP6 Urban Renewal

WP6 conducted three participatory workshops which included participants from local authorities and urban planning and other communities. Due to the participatory nature of these workshops the number of participants was restricted:

- Sainte-Anne, Paris, March 19-20, 2007: two participatory sessions with 25 participants in total
- TGI de Paris, Sep 18-19, 2007: two participatory sessions with 12 participants in total
- Urban density, Vienna, Dec 13, 2007: one participatory session with 8 participants.
- Wien, Exhibition "Draussen in der Stadt", Oct. 10 User: ~20
- Graz, OpenLab Night, Oct. 10 User: ~50
- Nara, Japan ISMAR, Nov 13.11 - 16.11. User: ~50
- Fira, Greece, PEACH Summer school, July User: ~40

WP7 CityWall

Helsinki City installatin in cooperation with Cultural Office Average 1000 per week

Eurovision , song competition 8 users

Samba Carnival 8 users

Juhlaviikot, Helsinki festival, Night of the arts General Public

Helsinki City installation in cooperation with Cultural Office General Public

WP8 TimeWarp

The TimeWarp game of WP8 was tested within 13 field trials during August and September. 24 end-users played with the first prototype of the game in the city of Cologne.

- August 1 – 2: 3 test runs with 7 participants.
- August 27 – 31: 4 test runs with 8 participants.
- September 11 – 12: 3 test runs with 7 participants
- September 26 – 27: 3 test runs with 5 participants

WP9 City Tales

A number of the City Tales demonstrators were tested during 2007.

- August 2007, one week of test runs consisting of 13 participants

Scientific cooperation with other projects or organizations

Scientific cooperation with other projects and organizations and their relevance to presence and Mixed Reality

- UOulu: Cooperation with University of Arts and Design, Helsinki, and with Department of Architecture, University of Oulu, in the Academy of Finland-funded Studio'n'site project in the area of mixed reality support for participatory urban design
- Uoulu: cooperation with City of Oulu in the Shanghai 2010-project (application of a City of Oulu demonstration booth in the Shanghai 2010 World Fair) on using mixed reality in urban space
- UOulu: Collaboration with City of Oulu and VTT Electronics in the SmartTouch-project on mixed-reality interaction experiments in urban space using near-field RFT technology
- FIT: Close cooperation with other researchers via the INTUITION NoE
- FIT: Collaboration with IPerG IP on MR gaming aspects
- FIT: Close cooperation with PEACH Presence CA
- FIT: Collaboration with ExploAR project regarding MR learning environments
- TUG: cooperation with PRESENCCIA e.g. on ubiquitous tracking
- Sony: IPerG integrated Project on Pervasive Gaming FP6 Programm collaboration regarding 3D animation in MR applications.

1.1.3 Training

Thesis

In this sub-section we list the individual B.Sc./M.Sc./PhD thesis finished within the scope of the project or closely related to the work of the project and supervised by members of the consortium

Candidate: Daniel Wagner

Supervisor: Dieter Schmalstieg

Type: Dissertation

Title: Handheld Augmented Reality

Date: 01.10.2007

Short Abstract:

Augmented Reality (AR) aims at developing new user interfaces. Although research has produced a large number of application prototypes and AR frameworks in the last 20 years, no project has yet been practical enough to create a mass market success. There are many reasons for this. Traditionally, AR researchers have primarily created prototypes that aim to solve engineering problems such as maintenance or new interfaces for complex environments such as head up displays for navigation and battlefield systems. Most researchers still see AR as a basic research area. Developing easy to use, practical applications, such as for home users, is therefore usually not a goal. Another problem with many Augmented Reality systems is the highly complex hardware setup, often including expensive commercial sensors, input devices and output devices. These devices are often bulky and fragile, since they were never meant to be operated by untrained users. Research at the Vienna University of Technology and the Graz University of Technology has aimed at moving Augmented Reality to a mass-market. Instead of specialized and expensive hardware, this project targets low cost mobile devices, namely mobile phones. In contrast to traditional AR hardware, people already own these devices and know how to operate them. Recently, processing capabilities of mobile phones have reached a level that makes these devices capable of running standalone AR applications and renders them ideal candidates for mass marketed Augmented Reality solutions. This thesis presents a framework that for the first time allows for the creation of practical AR applications on end user-owned devices. The software runs on a broad range of devices and has been used for several—some even commercial—applications. To prove the applicability of the new platform the author of this thesis has performed evaluations with untrained users in real-life environments such as museum exhibitions or conferences.

Candidate: Alessandro Mulloni

Supervisor: Dieter Schmalstieg

Type: Master

Title: A collaborative and location-aware application based on augmented reality for mobile devices

Date: 17.07.2007

Short Abstract:

The goal of the thesis project was to develop a case-study application to prove the feasibility of merging Computer Supported Cooperative Work, location-awareness, user mobility and Augmented Reality in a system based on standalone handheld platforms. The developed application is a multi-user collaborative Augmented Reality game based on the Studierstube ES framework and exploiting user mobility inside the environment as a strong game play component. The designed system has a client-server Bluetooth-based architecture where lightweight portable game consoles are used as standalone clients, relying on a central server only for data synchronization. The application can be partially or totally reused for non-entertainment scenarios where coordination of groups of workers in a cooperative distributed context and inside a large environment is required.

Candidate: Toni Räisänen

Supervisor: Antti Juustila

Type: Master thesis

Title: Configurable reflective ubicomp platform

Date 13. September 2007

Short abstract: The computers have become so integrated part of humans' day that they do not necessary realize using computers when operating some household device. These

systems are ubiquitous computing systems, which have different needs that a programming framework must meet. One of most important demands is configurability so that the user can use applications even when the environment changes. The configurability must happen at runtime to be able to change configuration during the use of the applications. The nature of ubiquitous computing systems are such kind that do not use traditional configurations where the input and/or output devices are connected to the same unit. Instead, the input/output devices are spread around the network. The need to change user interface solutions during the use of application is one of the roots for runtime configurability.

An ubiquitous programming platform was specified and prototyped. The platform makes possible to connect heterogeneous devices to one virtual computing unit. The prototypes developed during the project showed us that the chosen solutions were functional and the platform could use to implement runtime configurable ubiquitous applications. The research showed that there are multiple different kinds of approaches to confront the requirement of ubiquitous systems. This is even emphasized when the goal is to hide the details of heterogeneous applications and devices and the distributed nature of ubiquitous systems, so that application programmer does not need to take accounts these aspects when implementing a ubiquitous system. This is achievable when there are well-designed application programming interfaces, which support to construction of applications using fully detached software components.

Candidate: Michael Idziorek

Supervisor: Ina Wagner

Type: Master

Title: Tangible Tabletop Gaming, Die Ebene zwischen Brett- und Videospiele

Date: 21.08.2007

Short abstract: Despite the existing technical possibilities only very few attempts to combine the qualities of board- and videogames, within a hybrid system, have been made so far. These approaches are majorily limited to academic prototypes and no serious commercial platform of this type exists. Nowadays videogames can offer sophisticated graphics and sound as well as detailed modelling of several aspects of reality, i.e. Havok Physics. Videogames also have the potential to allow internet-play with players from all around the world. On the other hand social and interpersonal aspects are very poor compared to, even the simplest, boardgames. So a hybrid game should combine the possibilities of video games with the rich interpersonal experience of a boardgame. Such a hybrid game, where the players can simultaneously buy land, build facilities and exchange goods, using physical tokens, was implemented and evaluated on the *Tangible ColorTable* at the IGW Institute. The work presented explores the possibilities and the potential of utilizing Tangible User Interfaces for a new type of hybrid games. A concept for the combination of boardand videogames and the justification of the necessity of such systems, are discussed. Qualitative studies, primarily interviews with prospective players, substantiate the need of a hybrid gaming platform.

Participants trained in field trials

This part lists the individual field trials and the corresponding number of participants, which actually received training on mixed reality related technology as part of these field trials.

- 36 active participants in participatory workshops, learning how to use the Urban renewal prototype
- Approx. 50 students of the PEACH summer school trained on Mixed Reality gaming technologies (lecture + practical use of MR gaming technology)
- A total of 27 participants in TimeWarp demonstrator/prototype user trials trained on fundamental aspects of using and interacting through Mixed Reality technology using head-mounted displays.

Exchange of specialists among consortium teams

This part lists the exchange of specialists among the individual consortium teams for training purposes (i.e. either specialists sent to another partner to train people there, or researchers sent to another partner to be trained on a particular issue in order to become a specialist).

Gerhard Reitmayr from UCAM DENG visited TUG from 5.12.2008 – 9.12.2008. The focus of the exchange was the integration of the augmented map table system with the Studierstube infrastructure, and more specifically the Urban Sketcher application. Moreover, personnel at TU Graz were instructed in the setup, calibration and use of the system.

Joachim Rothauer from SONY visited TUG from 16.07.2007 – 17.07.2007 to get trained in the usage of the MR infrastructure tools which were needed to develop the MR-browsing application as part of WP9.

Markus Sareika from TUG visited TUW at 09.11.2007 to work on the technical migration of the UrbanSketcher and the ColorTable systems which are both used within WP6. This includes mutual training of both the UrbanSketcher and the ColorTable developers.

Anne-Kathrin Braun from FIT visited AAU at 09.11.2007 to discuss the integration of the Aalborg CV tracking into the Morgan framework.

Visits of senior researchers

The following senior researchers from outside the consortium visited project events or project partners:

Raphael Grasset

Place: TUG

Affiliation: HITLab, New Zealand

Date: 06.08.2007 - 02.9.2007

Blair MacIntyre

Place: TUG

Affiliation: Georgia Institute of Technology, USA

Date: 13.10.2007 - 16.10.2007

Mark Billinghamurst

Place: TUG

Affiliation: HITLab, New Zealand

Date: 13.10.2007 - 16.10.2007

Eyal Ofek

Place: TUG

Affiliation: Microsoft Research, USA

Date: 11.12.2007

Georg Stonawski

Place: TUG

Affiliation: VRVIS, Austria

Date: 04.05.2007

Itaru Kitahara

Place: TUG

Affiliation: ATR Intelligent Robotics and Communication Laboratories, Ibaraki, Japan

Date: 3.12.2007

Rod McCall

Place: FIT

Affiliation: ERCIM Fellow

Date: 1.8.2006 – 31.3.2007

From April 1st 2007 Rod McCall was hired by FIT and joined the project team as presence expert.

Keichii Sato

Place Uoulu

Affiliation: Illinois Institute of Technology, School of Design

Date: 11.6. – 16.6. 2007

Volkmar Pipek

Place: Uoulu

Affiliation: University of Siegen

Date: 4.11. – 6.11. 2007

Kari-Hans Kommonen

Place: Uoulu

Affiliation: Media Lab, University of Arts and Design, Helsinki

Time: 17.12. –18.12. 2007

Catherine Semidor

Place: UMLV, Paris

Affiliation: GRECAU-Architecture School of Bordeaux, France

Date: 19.07.2007, 19.10.2007

Cécile Régnault Bousquet

Place: UMLV, Paris

Affiliation: CRESSON/ Architecture School of Lyon

Date: 20.03.2007, 25.06.2007

1.1.4 Exploitation

Patents

We created a start-up to commercialize the technology www.multitouch.fi. Three of the researchers that worked in WP7 have founded the company. The company has negotiated IPR with the University. TKK owns the computer vision license software. Royalties from sales of the licenses go to TKK. New versions of the software developed from the start up company go back to TKK as part of the agreement. A patent search revealed there was already prior art with Sony Research in USA and Japan beginning in 1997, as well as Microsoft Technology, so patent applications through TKK were not submitted.

Standards

Within the previous working period no direct contributions to international, European, or national standards were made.

The project's Scientific Board takes note that concerning multimedia content, there could be a potential contribution towards standards. The technical implementation of the modules developed in the projects uses standards or de facto standards where appropriate, for example the use of X3D for graphics in Morgan in WP8 or SMS for the entrance tool in WP7. An independent contribution towards standards seems difficult because of the exploratory, iterative nature of the development, which defeats the objective of stable feature sets defined in advance. However, the further exchange of tools and dissemination activities could definitely benefit from some degree of standardization. For example, technologies with overlapping scope such as Morgan and Studierstube could benefit from the possibility of exchanging data files. This idea should be considered more in Year 3.

Industrial and other non-scientific collaborations

- FIT: Collaboration with Deutz AG on possible use of MR technology for quality management.
- FIT: Collaboration with Toolbox Software: supporting large-scale bakeries by MR.
- Sony: Sony Playstation, Walkmann and R&D departments collaboration to establish commercial opportunities for MR applications in the digital entertainment sector.
- Sony: Jamba, Workshop to establish MR suitability for light weight mobile applications.

Components used by other projects or 3rd parties

This sub-section describes number of components developed in the project used by other projects or third parties (open source, licensed, etc.)

- Component: Distributed media entrance and management
 - Project name: Studio'n'Site
- Component: Morgan Light framework
 - Project names: IPerG, CoSpaces
- Component: DEVAL device abstraction
 - Project names: IPerG, CoSpaces, ExploAR
- Component: 3D Reconstruction
 - Project name: WikiVienna

- Component: AR Scouting
 - Project name: Vidente

- Component: OpenTracker
 - Project names: Presencia, Ariser, Vidente, Doctoral College “Confluence of vision and graphics”, Pomar3D

As part of the work in WP7 researchers at TKK created a start-up to commercialize a multi-touch screen technology. The company is seeking funding www.multitouch.fi, has successfully negotiated IPR with the University and is having first customers.

1.2 Qualitative Indicators

In addition to the quantitative indicators used, the following qualitative measurement indicators will be used. This will include the following information and data:

1.2.1 Ethical and gender issues

Ethical issues

This sub-section provides an overview of the ethical issues that were raised by the showcases and how they were handled.

WP7 addressed issues of privacy concerning a) content contributed by the users to the CityWall installation, which may be offending or otherwise inappropriate, and b) identity - people can get offended by the fact that their pictures are shown in a public place in a central location of a city.

WP6 reflected on the potential of the representational techniques (both images and sound) used in MR tools for manipulating users.

WP6 and WP7 also addressed issues of empowerment, literacy, and participation, in particular the need for simplicity and transparency of the tools and afforded interactions. WP6 also reports on user participation requiring intense preparation and sufficient time for understanding and engaging with the MR tools in order to be able to contribute in an informed way.

WP8 noted that there is potential for people to ignore reality, thus causing potential safety problems to arise. This also results in a situation where interaction with real people is minimal thus leading to potential issues with social isolation when using visor based MR systems. It was also noted that members of the public would frequently make fun of those taking part. While none of these problems resulted in harm to the users they are issues which are being further explored.

WP9, reflected upon how to best encourage greater interaction with the real environment within the Street Beat system.

Recommendations

The Scientific Board sees no immediate problem with ethical issues. All test subjects gave informed consent to their participation throughout the trials. In the limited, supervised trials sensitive issues were typically not touched. However, the Scientific Boards suggests to WP leaders that in Year 3, when conducting larger, potentially unsupervised trials or trials with unknown users (such as in freely accessible public installations), care must be taken with respecting matters of privacy. Every freely accessible trial must contain a disclaimer if automated or manual recording or supervision is performed for scientific purposes.

Gender issues

Some changes in personnel have taken place in Year II of the project and according to the gender plan women have leading project positions:

- TKK: Ann Morrison will lead WP7 from Jan 2008.
- TUW: Valérie Maquil has replaced Thomas Psik as leader of the technology development group at TUW. Moreover, Lisa Ehrenstrasser, an industrial designer, has been recruited into the project. Both started working on their PhD thesis related to their research in IPCity.
- FIT: Anne-Kathrin Braun will lead WP8 from Jan 2008
- UMLV: Burcu Ozdirlik started working with the French team on May 2007.

Due to the novelty of the MR technologies and the intense and continuous redesign efforts, attention to gender as a research issue has been postponed to project Years III and IV, when

prototypes are more consolidated and our approach to studying presence and interaction in MR environments has been fully developed.

1.2.2 Overall project objectives

Please note that the progress towards the overall project objectives is not reported within this deliverable, but in Deliverable D1.7 – Annual Progress Report.

- Progress towards overall project objectives
 - To be reported as part of the annual project progress report

Adequacy of showcase structure

The project's Scientific Board evaluates the overall showcase structure regarding their representation and covering of the project's objectives. It then provides recommendations for modifications of the overall structure as well as for the further development of individual showcases. Those recommendations will be reflected in the detailed implementation plan for the next period.

The Scientific Board finds that the showcases overall are well suited to cover the objectives of the project. At the core, all showcases involve the interaction of real, non-technical users in outdoor environments with and through Mixed Reality Technology. Where necessary, adjustments have been planned for Year 3.

After the exit of Sony at the end of Year 2, the Showcase WP9 "City Tales" will be re-defined with the help of the new partner Imagination GmbH. It will continue participation of citizens as in the first two years, but will also introduce artists who express themselves with the technological tools developed in WP9 as a new, potentially very interesting user group. This will help to diversify the research and also aid dissemination.

The success of the research of Large-Scale Event in WP has led to another adjustment. Several publications in the best publication forums including best paper awards have been achieved. Other achievements include the inclusion in official programs of events, participation in all most important Helsinki Events, public Installation with tens of thousands users and the founding of a start-up company as the most successful exploitation.

Rather than focusing on more incremental publishing after the initial success, WP7 will be re-aligned to start with a new and fresh brief to keep the creativity level high. The new topic, Environmental Awareness, is of growing importance in European cities. Moreover, the new topic will allow overcoming the problem that events last only few days and therefore are not ideal for trials that require longitudinal studies.

Thus, the showcases 2 and 4 are replaced by new or adapted showcases after year 2, while the showcases 1 and 3 will continue their work.

As the originally planned competitive call (call for new partners) has already successfully been finished within year 2, the Scientific Board recommends based on the results of the showcase evaluation, the steps mentioned above, and in accordance with the description of work, that no further competitive calls (for partners or showcases) are made.

Relevance to presence and mixed reality

The Scientific Board further evaluates each activity regarding their relevance to presence and Mixed Reality (under particular consideration of the overall urban context of the project).

The Scientific Board finds the activities conducted in Year 2 generally relevant to the study of Presence in Mixed Reality environments.

- WP6 is primarily focusing on urban renewal projects and interventions. In their analysis of the presence and interaction aspects they emphasize the relevance of dynamic representations (flow, movement, sketching on a scene); characteristics of the content (fuzziness, stimulating combinations of realistic and abstract, narrative

and expressive content); agency (participants' co-constructing, performing, dynamically enacting MR scenes); sense of place and culture; materiality (the engaging capacity of objects); spatial aspects (spatial alignment of tools and views, scale/depth/volume, orientation, and so forth).

- WP7 researches a new type of mixed reality with tangible interfaces that are available to the general public in an urban environment. The architecture allows for physical intervention and contributes by extending available interventions of presence and mixed reality in the urban environment.
- WP8 has specifically explored the relationship between MR content and presence across the spectrum of experience from real to purely virtual. It has explored this from the perspective of social, temporal and physical presence as well as with specific respect to aspects such as place and elements in the WP3 concept map. The result is a more thorough exploration of the effect of mixed realities on “where” people feel and with “whom”. In particular how connected or otherwise such experiences need to be in reality in order to create unified (continuous) experiences or to highlight boundaries between different mixed-reality locations.
- WP9 has explored presence in a number of contexts. From the perspective of Street Beat the objective has been to examine aspects of how normal mobile phone technologies can influence the users' sense of cultural presence and place. In addition is explored how 3D animations can be used to influence the sense of presence the developed prototype allows upload of user generated content and MR manipulation in an easy to use online client.

1.2.3 Involvement of user groups

Overview of kinds of user groups involved

WP6: Showcase 1: Urban Renewal

For the participatory workshop TGI de Paris, WP6 involved several new user groups:

- Ministry of Justice: M. Q. Tran, project chief
- Paris Municipality: Architect Voyer: Corinne Asselin
- Journalists: Jacques-Franck Degioanni, Journalist–Le Moniteur
- Library BNF: Marie-Pierre Marché
- Mk2-director: Bertrand Roger

As well as several architects and urbanists: Loïc Couton, architect; Safwan Chendeb, CiTu/University of Paris 1- 8; Dana Diminescu, EHES; Gérard Baudin / Jérôme Monnet, LTMU/UMLV; Rainier Hoddé, architect; Alexis Paljic, engineer - Ecole des Mines; Catherine Semidor, GRECAU-Architecture; School of Bordeaux.

WP7: Showcase 2: Large-scale events

In WP7 the CityWall installation has been setup in the city centre of Helsinki from the beginning of May 2007. It has been available for general public all the time and has had an average of a thousand users per week. The CityWall was also part of the large-scale events Eurovision Song Contest, Samba Carnaval and Helsinki Festival. All festival visitors could use the CityWall freely.

In two user studies involving the CityWall installation in large-scale events and a mobile component groups of users were recruited for research purposes. During a Eurovision opening party in the “fans center”, a group of six female 18–22 years old supporters of Hanna Pakarinen, the Finnish competitor, were recruited. Most of them were students. For the study happening during the Samba Carnaval, a group of four users (4 females) and a

group of three users (2 females, 1 male) were recruited from spectators. All the users were students, aged 16–25. The users were recruited using convenience sampling at the beginning during the opening party of the carnival.

WP8: Showcase 3: TimeWarp

In the TimeWarp field trials several kinds of user groups were involved. The great part of the participants consists of students in computer science or in communication studies. Furthermore IT professionals, who were partly familiar with AR technology, took part in some test runs. Non-IT participants such as journalists and tourist guides were also involved.

WP9: Showcase 4: City Tales

For City Tales two different user groups were involved. For StreetBeat we had a diverse group of users from School pupils and Students to young professionals and for Leo's Adventures we chose a peer study which mainly consists of 3D and gaming professionals.

Additional user groups to be addressed

The project's Scientific Board reviews the user groups involved and tries to identify additional user groups missing, providing recommendations which of them should be addressed by existing and future showcases.

WP6 seeks to more actively engage with citizens affected by urban renewal projects. Up to now we were able to invite and engage a limited number of residents - people from the neighborhood (TGI de Paris, the urban renewal office for Vienna's 16th district), personnel (e.g. from the psychiatric hospital at Sainte-Anne). One insight is that involving citizens in ways that activates them requires a dedicated effort when preparing and conducting a workshop (informing residents, supporting them in creating content, expressing their perspective). Hence, the number of workshops planned for project years III and IV will be reduced so as to make place for the timely preparation of citizens and for longer participatory workshop events.

In WP7, the new topic Environmental Awareness will include citizens concerned with ecology of cities.

In WP9, the new scenario investigated by new partner Imagination GesmbH will involve artists who express themselves through Mixed Reality technology in a Mixed Reality urban environment.

1.2.4 Publications and presentations

Assessment of type and quality of publications

- The type and the quality of the publications (conference rating (CHI, SIGGRAPH, etc.), journals, full papers/short papers/etc.)
 - Rating by scientific board

The Scientific Board finds that there is a fairly good level of publication success in Year 2. Particularly noteworthy is the success of WP7 in the well-respected ACM CHI conference. Also several publications are accepted at well respected venues, such as IEEE Virtual Reality, IEEE ISMAR or GROUP. Another noteworthy publication activity is the workshop on "Workshop on Urban Mixed Realities - Technologies, Theories and Frontiers", organized by IPCity researchers at the CHI 2008 conference in Florence. The Scientific Board suggests that in Year 3, it may be time to consider an increased number of journal publications summarizing the results of work achieved so far.

Citation index

This citation index covers all individual and joint publications directly related to the work undertaken within the contract.

- Wagner, D., Schmalstieg, D. (2007). Muddleware for Prototyping Mixed Reality Multiuser Games. In *Proc. of IEEE Virtual Reality 2007 Conference (VR 2007)*, March

10-14, 2007 (Charlotte, NC, USA), IEEE, Piscataway, NJ, USA, 2007, 235-238. (3 citations)

- Jacucci, Giulio, Wagner, Ina (2007) Performative Roles of Materiality for Collective Creativity In: Proceedings of Creativity & Cognition 2007, June 13-15, 2007, Washington DC, ACM SIGCHI, 73-82. (2 citations).
- Jacucci, G., Oulasvirta, A., Ilmonen, T., Salovaara A., Evans, J., “CoMedia: Mobile Group Media for Active Spectatorship”. In *Proceedings of the SIGCHI conference on Human factors in computing systems*, ACM, 2007, pp. 1273 – 1282. (1 citation).

For the Year 1, there is one publication cited:

- Broll, Wolfgang, Ohlenburg, Jan, Lindt, Irma, Herbst, Iris, and Braun, Anne-Kathrin. “Meeting Technology Challenges of Pervasive Augmented Reality Games”. In *Proc. of ACM Netgames 2006* (Singapore, Oct. 30-31, 2006) (1 citation).

Invitations to journals and presentations

Invitations to publish in journals and invitations to talks, presentations, and demonstrations at conferences

- IPCity as a whole was invited by PEACH to contribute to its first summer school.
 - Several researchers (Wolfgang Broll, Giulio Jacucci, Rod McCall) from the project were invited to give lectures at the PEACH summer school
 - IPCity (Jacucci, Rod McCall) have been asked to submit a proposal for a presentation at the second PEACH summer school.
- Wolfgang Broll was invited by the EC to give a presentation at the Computer-Human-Confluence workshop and contributed to the workshop summary
- Dieter Schmalstieg was invited to deliver a keynote address on Mobile Augmented Reality at the largest international Mixed Reality conference, ISMAR 07, in Nara, Japan.
- The members of the CHI 2008 workshop are responsible for publishing a special issue of the Psychology journal.

Assessment of invitations

The Scientific Board finds that the number of invitations is fair, but not outstanding. It is recommended that the IPCity researchers extend their networking to increase the number of invitation. However, it should also be noted that it takes a while to build up dissemination activities, and that invitations cannot be directly steered, but are partially a question of opportunities.

Joint publications

The amount of cooperation / joint publications by the project consortium

- FIT and Sony have produced 4 joint publications
- TUW and HIIT have produced one joint publication
- TUW, FIT, HIIT and Uoulu have produced one joint publication and one joint panel presentation

Assessment of joint publications

The Scientific Board finds that the number of joint publications could be increased. Hopefully, this will come naturally as the project progresses, since it is obviously necessary to build up technologies and techniques first (leading rather to publications from individual partners), and then joint experiments are performed, which can lead to more joint publications. The SB finds it desirable to disseminate the projects mission as a whole and suggests a publication on the conceptual level, related to WP3, for that aim.

1.2.5 Cooperation within project consortium

Contributions of project partners to the IPCity newsletter

The base for contributions to the IPCity newsletter broadened considerably from previous year, when it was largely produced by the editor of the newsletter, Uoulu. This year other partners than Uoulu contributed already about 30% of the newsletter content.

Contributions of the work packages to the IPCity web page

Each research work package has provided the content to the corresponding section to the IPCity website. The content, comprising of text, images, illustrations and links is then placed to the website either by the workpackage responsible person, or as usual, by WP2 webmaster. After the initial setup of the website, there have been two update rounds to the work package sections in the website.

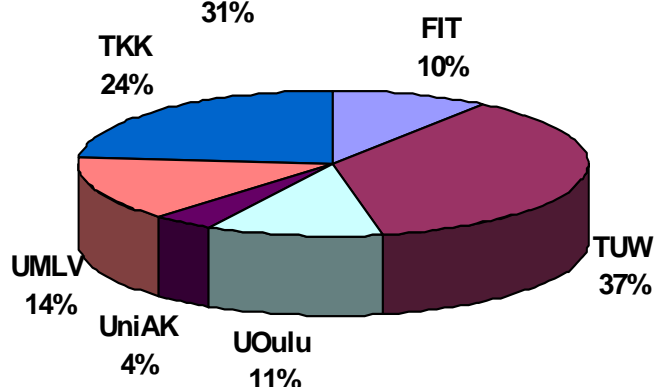
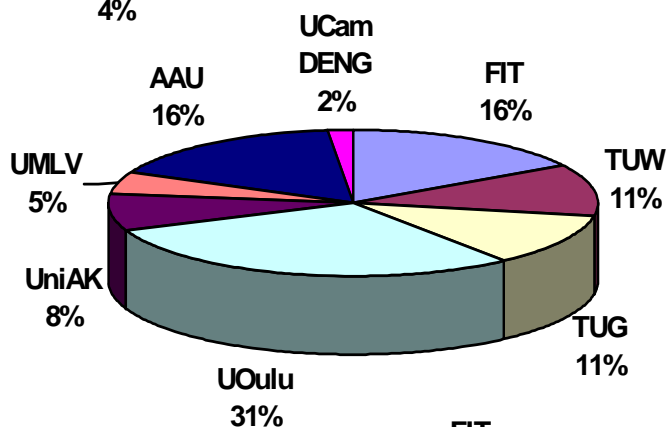
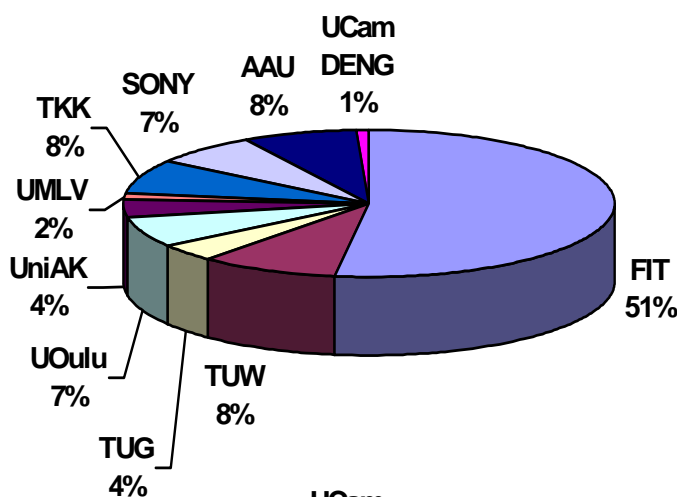
Contributions to joint deliverables

WP1

All project partners represented in the Executive Board contributed to D1.7 – Annual Progress Report for Year 2.

Deliverable D1.8 – Evaluation Summary Report for Year 2 received contributions from all partners represented in the Executive Board, most members represented in the Management Board and the Scientific Board.

Deliverable D1.9 – Detailed work plan for months 25 – 42 is based on contributions from the Executive Board members and minor input from the other project partners.



WP2

While dissemination was done by almost project partners, the deliverable D2.4 was mainly assembled by UOulu with minor input from other project partners.

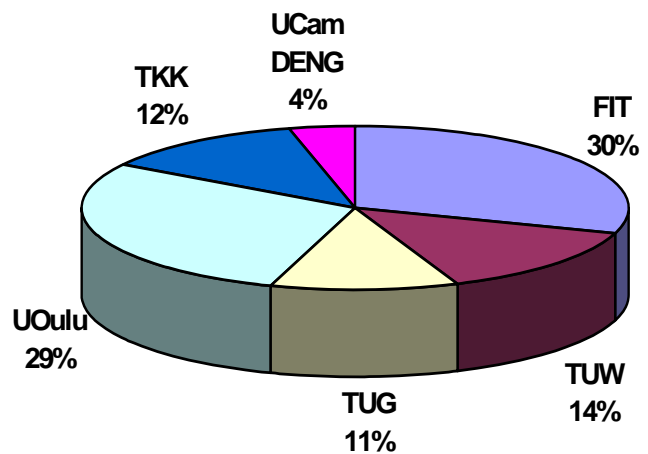
WP3

The preparation of D3.3 benefitted from the intense engagement of FIT, HIIT, UMVL, UniAK, Uoulu, and TUW in the form of a) field trials and their analysis, b) participation in a WP3 workshop Nov 29-30, 2007, and c) contributions of texts.

WP4

All partners involved in the research work contributed to the deliverable D4.2 and described the components and tools they worked on. FIT and TUG jointly wrote the section on the shared vision of the research workpackages WP 4 and WP 5. FIT finalized the document.

Each partner contributed to at least two of the building block (aligned with D4.2), while some building blocks contain different technologies from single partners, the activities within the building blocks was coordinated and discussed by the involved partners. The following diagram shows partner contribution to each of the building blocks.



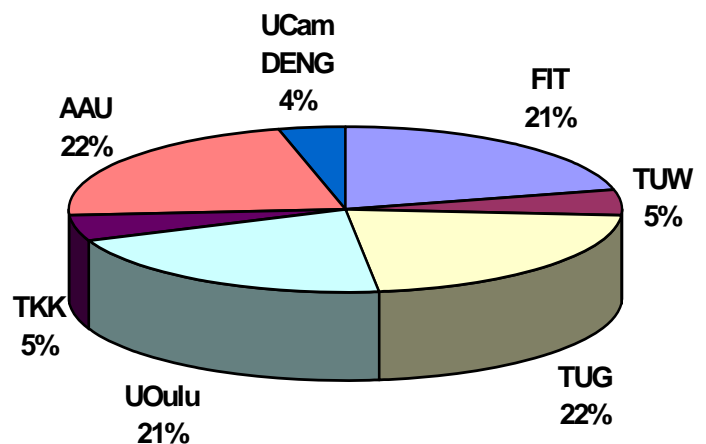
WP4 building blocks (aligned with D4.2) and contributing partners:

- Authoring:
 - FIT, TUV, UOulu, UCam
- Data and Event Distribution:
 - FIT, TUG, UOulu
- Interaction:
 - FIT, TUV, UOulu, TKK, UCam
- Ambient Displays:
 - TKK, UCam

WP5:

All partners engaged in the infrastructure research work contributed to the deliverable D5.2 and described the components and tools they worked on. FIT and TUG jointly wrote the section on the shared vision of the research workpackages WP 4 and WP 5. TUG finalized the document.

Each partner contributed to the development within the building blocks which contain different technologies from single partners, the activities inside the building blocks were coordinated and discussed by the involved partners.

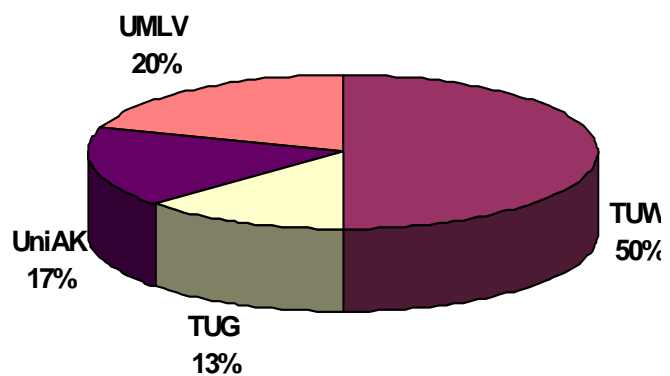


Building blocks of WP5 (aligned with D5.2) and contributing partners:

- Tracking:
 - UOulu, UCAM DENG, TKK, AAU
- Storage / Content:
 - UOulu, TUW
- Computation:
 - FIT, TUG
- Mobile AR/MR
 - TUW, TUG, FIT

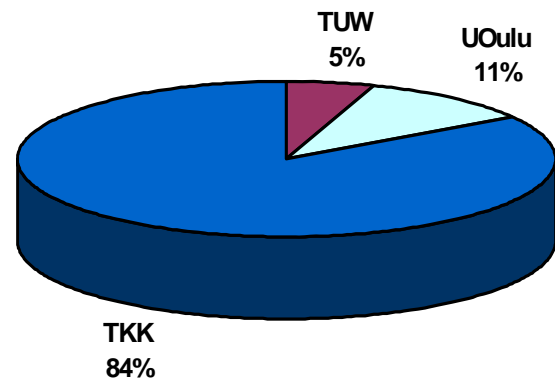
WP6

In WP6 UniAK, UMVL, and TUG joined TUW in preparing and carrying out field trials, analyzing the results, and contributing texts to D6.2.



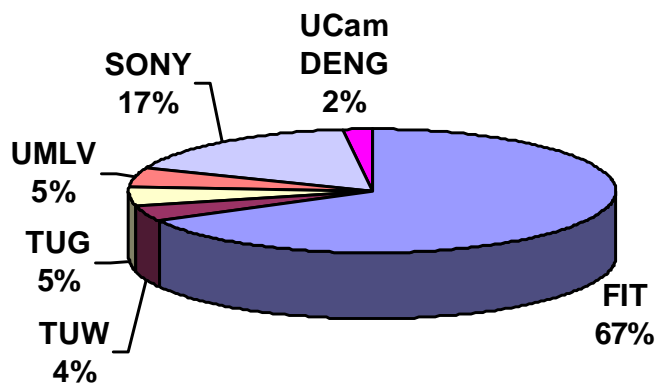
WP7

In WP7 field trials were prepared, implemented and analyzed by TKK researchers with the cooperation of Helsinki Cultural Office and events: Eurovision, Samba Carnival, and Juhlaviikot, Helsinki festival, Night of the Arts.



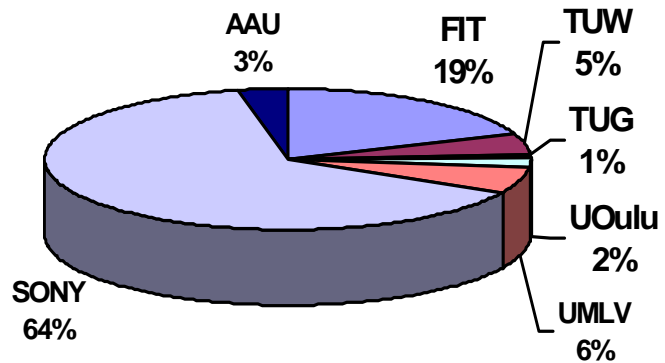
WP8

In WP8 FIT was supported by SONY, TUW and UMLV in designing the game for the first prototype and in 3D modeling of the virtual objects. Furthermore, FIT collaborated with TUG and UCAM to integrate tracking functionalities in the TimeWarp application.



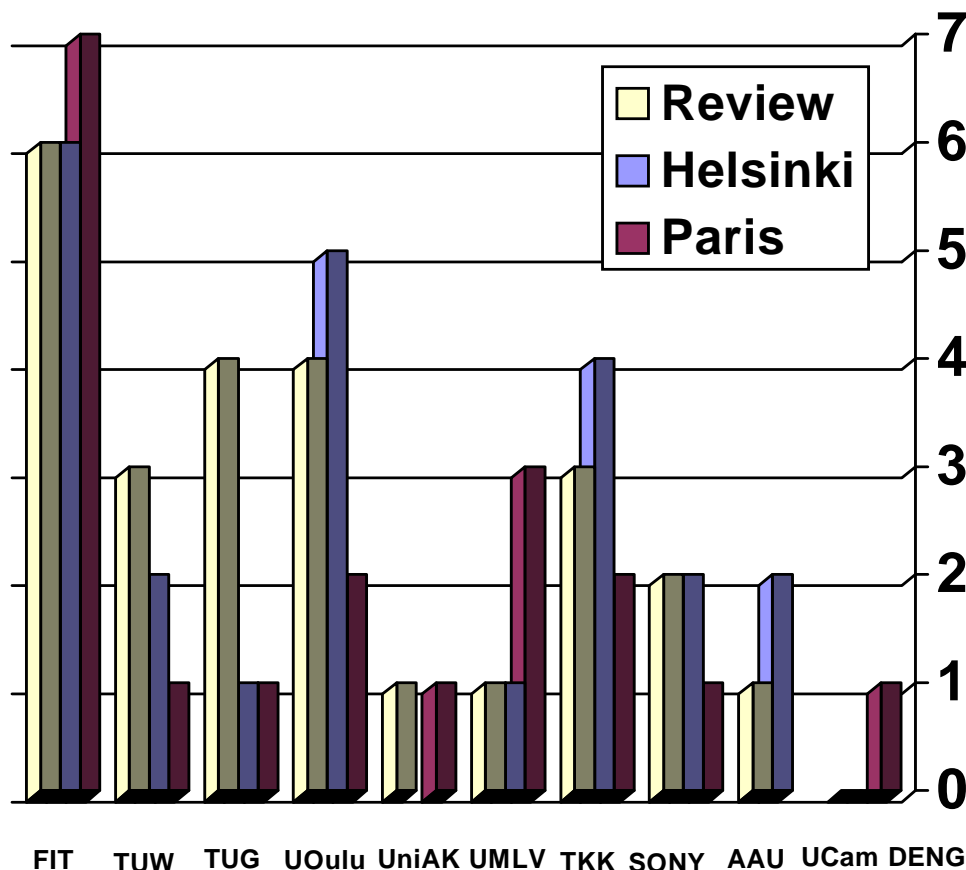
WP9

Major cooperation from Sony and FIT in preparation for 9.2 the evaluation of StreetBeat and an ongoing MR content creation collaboration that resulted in a CHI08 Poster “12 Principles of Mixed Reality Animations”. Further cooperation also took place with respect to the CHI 2007 workshop presentation.



Participation in general meetings

All project partners participated in regular project meeting, i.e. the review meeting at FIT in Sankt Augustin, the general project meeting at TKK in Helsinki, and the general meeting at UMLV in Paris. The overall number of participants from each partner to those meetings is shown in the diagram. Further, most project members participated in the kick-off workshop with the new partner in Cambridge.



Interaction among disciplines beyond current work plan

According to the overall and the detailed implementation plan there is a significant amount of interaction among disciplines within the consortium on three different levels:

- By different partners within individual research work packages in order to benefit from the individual expertise, cooperated on new topics, and combine different yet separate technologies.
- By different partners within individual showcases in order to create integrated Mixed Reality applications, to carry out the corresponding field trials, and evaluate their results.
- Between different partners from research work packages and showcases in order to apply research results to the showcases and receive feedback regarding future research.

Beside those, this sub-section lists additional interaction among disciplines and partners, not originally foreseen in the work plan, which evolved from individual needs or emerging perspectives.

- TUW, UMWL, and FIT started a new cooperation in sound research. This topic has emerged from the showcases 1 and 3 (WP6 and WP9). After initial interaction on this topic sound research was added as objective to WP3 (from a conceptual point of view) and to WP5 (from a technical point of view) to provide research results to all showcases. As research is split between WP3 and WP5, the close cooperation on this topic will glue together WP3, WP5, WP6, and WP8.
- Oulu and TKK cooperated in the development of Illuminate Technology.
- AAU contributed to the development of the color tracking for TUW.
- AAU contributed vision based localization techniques to Sony's MR browsing developments.
- Oulu and TUW collaborated in the joined development of the HMDB.

2 Work Package Specific Indicators

This section contains the results based on individual indicators to measure the success and impact of the individual research and showcase work packages. These indicators were defined in the revised deliverable D1.2 and were based on the success criteria for the individual work packages as specified in the description of work. No additional success criteria for WP2 were specified in this section, as those criteria are already completely covered by the overall quantitative and qualitative success criteria (see previous section).

2.1 WP3 Research Activity: Cross Reality Presence and Experience

For this 'theory and methods' work package there are four main criteria of success:

- Conceptual map actually used and further developed in the four showcases
- Submission of at least one journal paper and two conference papers
- Common evaluation approach accepted by all showcases
- Joint analysis of presence and mixed reality across showcases

Use of concept map

In the working meeting in Vienna all showcases presented their research on presence and interaction using the initial concept map, which proved useful. However, also a series of suggestions was made how to improve the conceptual framework. We decided to place our emphasis on presence and user experience, on users actively creating connections between physical and digital spaces and how this is supported by IPCity technologies, as well as on the relationships between 'existing' and 'imagined' spaces.

An important additional perspective to be integrated in the concept map is the urban planner's view, with the notion of 'the project' as mixed-reality, the approach to designing for experience, as well as intervention as an urban strategy. A new research topic to be integrated with the concept map is the use of sound.

Publications

Jacucci, Giulio, Wagner, Ina (2007) Performative Roles of Materiality for Collective Creativity In: Proceedings of Creativity & Cognition 2007, June 13-15, 2007, Washington DC, ACM SIGCHI, 73-82.

McCall, R. Virtual Reality Grows Up. Interfaces, British Computer Society (to appear).

Members of the IPCity consortium contributed to the 10th International Workshop on Presence: McCall, R., Wagner, I., Kuuti, K. & Jaccuci, G. Urban Mixed Realities: Challenges to the Traditional View of Presence, 10th International Workshop on Presence, Barcelona (http://www.temple.edu/ispr/frame_conferen.htm)

A publication in a special issues of PsychNology has been planned.

Furthermore, a workshop on 'Urban Mixed Reality' as part of CHI 2008 is in preparation (see McCall, R., Wagner, I., Kuuti, K. & Jaccuci, G. Urban Mixed Realities: Technologies, Theories and Frontiers, CHI 2008, Extended Abstracts).

Common evaluation approach

The agreed upon evaluation framework was followed in all four showcases. It was felt that WP3 should accentuate the different approaches in each showcase – from interventions in an urban environment to more playful forms of engagement – since our experience is that this enriches our perspectives on presence and interaction.

Joint analysis of presence and mixed reality across showcases

Joint analysis helped all showcases to rethink and better focus their research questions. The focal point common to all is to understand users’ interweaving and connecting of the real world and events in it with the constructed ,virtual’ world, be it a game experience, interactions on a multi-touch screen, or the imagining and experiencing of changes to a real place.

2.2 WP4 Research Activity: Cross Reality Interaction Tools

The general objectives of this research workpackage are to provide tools which allow for easy creation and support of sophisticated multi-modal user interfaces and mobile mixed reality environments.

Thus final indicators for the success and impact of the tools and services developed are:

- The number of tools and services developed within the current working period/since project start/based on existing technology.
- Significant progress in the development of technologies of each major building block
- Each technology requested by at least two showcases and actually used by at least one showcase
- Each technology developed is contributing to the overall project objectives
- Submission of at least six conference and/or journal papers (at least one for each of the five major building blocks)
- Identify new technologies developed within the project not available elsewhere

Tools and services developed within previous working period

The number of tools and services developed within the previous working period/since project start/based on existing technology.

Tools and services developed within the previous working period		
since project start	current working period	based on existing technology
<ul style="list-style-type: none"> • Interaction Prototyping Tool • AuthOr • ColorTable • OpenVideo 	<ul style="list-style-type: none"> • Multi-Touch Display • Mobile Media Collector • Location Based Media Browsing on Paper Maps 	<ul style="list-style-type: none"> • Augmented Map Table • MRIML • OpenTracker • DEVAL

Significance of progress in the development of technologies

See Deliverable D4.2 for a detailed description.

Use of technologies by showcases

Each technology developed must be requested by at least two showcases and must actually used by at least one showcase. The following table shows for each technology, which showcases are interested in this technology (foresee to use it in future prototypes) and those already using it.

Tool or service	Interested showcases (bold actually using it)
Interaction Prototyping Tool	WP 6, WP 8, WP 9
AuthOr	WP 6, WP 7, WP 8 , WP 9

MRIML	WP 8
OpenTracker	WP 6, WP 7, WP 9
OpenVideo	WP 6, WP 7, WP 9
ColorTable	WP 6
Mobile Media Collector	WP 6, WP 9
Location Based Media Browsing on Paper Maps	WP 7
Multi-Touch Display	WP 7
Augmented Map Table	WP 6, WP 7, WP 8

Contribution of individual technologies developed to overall project objectives

The following table shows the contribution of the individual tools to the overall project objectives regarding Mixed Reality technologies and applications (as listed in the project's description of work).

Overall objective	Contributing tools
Mixed Reality interaction prototyping	Interaction Prototyping Tool, MRIML, ColorTable
Device abstraction and independency	Interaction Prototyping Tool, MRIML, OpenTracker, DEVAL, OpenVideo
Cross-reality content authoring	Interaction Prototyping Tool, MRIML, ColorTable, MMC
Configurable infrastructures	OpenTracker, DEVAL
Semi-stationary outdoor Mixed Reality	-

Paper submissions for individual building blocks

Submission of at least six papers to conferences and/or journals (at least one for each of the five major building blocks)

Building block	Publications
Device abstraction	<ul style="list-style-type: none"> Herbst et al 2007 Herbst et al 2008 Newman et al 2007 Ohlenburg et al 2007
Data and event distribution	<ul style="list-style-type: none"> Juustila et al 2007
Interaction Prototyping and Authoring	<ul style="list-style-type: none"> Broll et al 2008 (VR 08) Broll et al 2008 (CG&A) Maquil et al 2007 Maquil et al 2008 Ohlenburg et al 2008 Pirchheim et al 2007
Ambient Displays	<ul style="list-style-type: none"> Peltonen et al 2007

Audio and Videostreaming	<ul style="list-style-type: none"> • Wittkämper et al 2007
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New technologies developed not available elsewhere

- Multi-Touch Display
- ColorTable
- Mobile Media Collector
- Augmented Map Table

2.3 WP5 Research Activity: Mixed Reality Infrastructure

The general objectives of this research work package is to provide mixed reality infrastructure components, which allow for easy set-up and use of sophisticated mobile and stationary mixed reality environments.

Thus final indicators for the success and impact of the tools and services developed are:

- The number of components/technologies developed within the current working period/since project start/based on existing technology.
- Significant progress in the development of technologies of each major building block
- Each technology requested by at least two showcases and actually used by at least one showcase
- Each technology developed is contributing to the overall project objectives
- Submission of at least six conference and/or journal papers (at least one for each of the five major building blocks)
- Identify new technologies developed within the project not available elsewhere

Tools and services developed within previous working period

14 different technologies have been developed which are already used by the different showcases.

Tools and services developed within the previous working period		
since project start	current working period	based on existing technology
<ul style="list-style-type: none"> • Bluetooth Media Dispatcher • Vision based localization • Distributed media entrance and management system • Mobile presence scanner • HMDB interfacing • Cal3D XSG • MR tent • AR-Scouting • Mobile AR System • Morgan Light 	<ul style="list-style-type: none"> • Illuminate Technology • Spatial Sound 	<ul style="list-style-type: none"> • Augmented Map Table • 3D Reconstruction

Significance of progress in the development of technologies

- Significant progress in the development of technologies of each major building block
 - Identification of development of the previous working period by WP5

A description of the progress of each major building block is given in deliverable D5.2.

Use of technologies by showcases

Each technology developed must be requested by at least two showcases and must actually used by at least one showcase. The following table shows for each technology, which showcases are interested in this technology (foresee to use it in future prototypes) and those already using it.

The following table shows which IPCity showcases already use infrastructure components developed or extended within work package 5, or intend to use this in the future.

Tool or service	Showcases
Interactive 3D reconstruction	WP 6
AR scouting	WP 6
Distributed media entrance and management system	WP 6, WP 7, WP 9
MR tent infrastructure	WP 6
Spatial audio	WP 6, WP 8
Vision based localization	WP 6, WP 9
HMDB Interfacing	WP 6, WP 9
Mobile presence scanner	WP 7
Illuminate	WP 7
Morgan Light framework	WP 8, WP 9
Cal3D XSG	WP 8

Contribution of individual technologies developed to overall project objectives

The following table shows the contribution of the individual tools to the overall project objectives regarding Mixed Reality technologies and applications (as listed in the project's description of work).

Overall objective	Contributing technologies
Mixed Reality interaction prototyping	Muddleware
Device abstraction and independency	Muddleware
Cross-reality content authoring	HMDB & interfaces, Bluetooth Media Dispatcher, Cal3DXSG, Interactive 3D Reconstruction / AR-Scouting
Configurable infrastructures	Muddleware, Illuminate, Map Table, Vision Based Localization, Spatial Sound, Morgan Light
Semi-stationary outdoor Mixed Reality	MR-Tent, Mobile Presence Scanner, Mobile AR System

Paper submissions for individual building blocks

Submission of at least six conference and/or journal papers (at least one for each of the four major building blocks)

There are **12** accepted publications and **1** pending submission and **1** rejected submission about mixed reality infrastructure components.

Conference/journal, date or timeframe	Title or topic	Authors	Status
Tracking			
International Workshop on Image Analysis for Multimedia Interactive Services	Uniqueness filtering for local feature descriptors in urban building recognition	G.P. Nguyen and H.J. Andersen	Rejected
IEEE 2008 Winter Vision Meetings, Workshop on Application of Computer Vision	Urban building recognition during significant temporal variations	G.P. Nguyen, H.J. Andersen, and M.F.Christensen	Accepted
Storage/Content			
CHI 2007	Bringing Urban Design Site to Studio by using a Remote Surveillance Camera	Juustila, Antti; Kangas, Tanja; Räisänen, Toni; Kuutti, Kari; Soudunsaari, Leena	Accepted
Proceedings of 30th Information Systems Research Seminar in Scandinavia	Atelier Infrastructure for Ubiquitous Computing.	Juustila, A., Räisänen, T.	Accepted
VR 2007	Muddleware for Prototyping Mixed Reality Multiuser Games	D. Wagner, D. Schmalstieg	Accepted
Mobile AR/MR			
To appear in a special edition "Mobile Spatial Interaction" of ACM Personal and Ubiquitous Computing Journal, 2008	Handheld Augmented Reality for Underground Infrastructure Visualization	Gerhard Schall , Erick Mendez , Ernst Kruijff , Eduardo Veas , Sebastian Junghanns , Bernhard Reitinger, Dieter Schmalstieg	Accepted
Workshop on Mobile Spatial Interaction (in conjunction with ACM CHI '07), 2007	Mobile Geospatial Augmented Reality using Urban 3D Models	Schall, Gerhard, Mendez, Erick, Reitinger, Bernhard, Junghanns, Sebastian, Schmalstieg, Dieter	Accepted
IEEE Virtual Reality '07	Augmented Reality Scouting for Interactive 3D Reconstruction	Reitinger, Bernhard, Zach, Christopher, Schmalstieg, Dieter	Accepted
ISMAR 2007	Urban Sketcher: Mixed Reality on Site for Urban Planning and Architecture	M. Sareika, D. Schmalstieg	Accepted
IEEE Computer Graphics & Applications.	Towards Next-Gen Mobile AR Games	Wolfgang Broll, Irma Lindt, Iris Herbst, Jan Ohlenburg, Anne-Kathrin Braun, Richard Wetzel	Submitted
CHI 2008 - Workshop	Urban Sketcher: Mixing Realities in the Urban Planning and Design Process	M. Sareika, D. Schmalstieg	Accepted

Computation			
IEEE International Conference on Computer Vision	Towards Wiki based density matching	A. Irschara, C. Zach, H. Bischof	Accepted
VR 2008	Extending X3D with Perceptual Auditory Properties	Katharina Garbe, Iris Herbst	Accepted
Proc. of 10 th Int.Conf. on Human and Computers 2007 (HC2007), Dec, 13 th - 15 th , 2007, Duesseldorf, Germany	Spatial Augmented Reality	Katharina Garbe, Iris Herbst, Jens Herder	Accepted

New technologies developed not available elsewhere

Illuminate Technology, Bluetooth Media Dispatcher, Vision based localization, Distributed media entrance and management system, Mobile presence scanner, HMDB interfacing, Cal3D XSG, Spatial audio, MR tent, AR-Scouting, Mobile AR System, Morgan Light

2.4 Common criteria for all showcases

Conformance with concept map

The prototypes and application concepts developed in showcases have to address more than half of the issues of the Concept Map as provided by WP3.

A appropriate analysis is provided in the deliverable D3.3.

Conformance with technologies developed

All application prototypes must primarily be based on technology developed in WP4/5 .

If the conformance is not achieved, corrective actions have to be taken. Either the required technology has to be added to one of the research work packages (if at least two showcases require this technology) or the showcase has to be adapted to be in line with the overall project objectives, or the showcase will have to replace technologies by those developed within the project. This is described in detail in the individual showcase deliverables.

Collection of user group feedback

Feedback has to be collected from at least one independent user group and one independent group of stakeholders. The results are reported in the individual showcase deliverables and verified by WP3.

Dissemination

Each showcase will have to submit at least two conference papers each year. The individual submissions are reported in each showcase sub-section and in detail in the individual showcase deliverables.

2.5 WP6 Showcase Activity: Urban Renewal

The main criteria of success for WP6 is to be able to demonstrate how different groups of users in real urban renewal contexts use the technology prototypes for collaboratively envisioning change, how this supports the participation of citizens in planning and improves the quality of the planning process. Other criteria are

- The number of urban renewal situations that can be supported with the developed concepts
- The number of 'non-expert' users (involved and interested citizens) that visit the MR-Tent

- The amount and nature of feedback from different urban planning groups and citizens and the qualitative evaluation of this feedback
- The diversity and relevance of content - created and used during workshops and public demonstrations
- The ability of the Urban Renewal applications to provide continuous support during the event, and to be useful before or after the event.

Scope of urban renewal situations

In project year 2 three field trials in the form of participatory workshops connected to real urban renewal projects were carried out. The nature of these three urban renewal projects is quite diverse. The project in Sainte-Anne is small scale. A scenario had been prepared, which focused on the wall enclosing the psychiatric hospital. The wall evokes issues such as closure/openness, intimacy/exposure, and safety/security. As a consequence, emphasis was on how small interventions, such as creating openings in the wall would affect the ambience of the place and people's feelings.

TGI de Paris is about planning a new court house close to the Seine and the Bibliothèque Nationale de France (BNF). The program includes three main issues: creation of a large esplanade which will be covering the existing railways between the future TGI and the BNF (Library) with housing blocks to be built on the esplanade; use or destruction of an existing industrial building (la halle Freyssinet) from the beginning of the 20th century and of great historic importance; accessibility of the site: progress from the main public transportation (especially from the metro stations), entrances to the TGI, differentiation of the different users, etc.

Finally, the last workshop, with a huge urban planning area (,Flugfeld Aspern') as a topic, is to do with large scale planning issues.

One insight from experimenting with these different urban renewal situations with different participating stakeholders is that they result in complex, partially conflicting requirements, which potentially undermine the desired simplicity and transparency of interactions. This is why we started to simplify and somehow ,specialize' the technology configurations in support of different purposes.

Urban Renewal Prototype I	March 19-20, 2007	Psychiatric hospital of Sainte-Anne, small scale urban project	25 active participants
Urban Renewal Prototype II	Sep 18-19, 2007	TGI de Paris, medium scale urban planning project	12 active participants
Urban Renewal Prototype III	Dec 13, 2007	Urban density workshop Fulgfeld Aspern, large scale urban planning project	8 active participants

The number of 'non-expert' users (involved and interested citizens) that visit the MR-Tent

As already explained in 1.2.3, field trials made clear that special effort needs to be dedicated to recruiting, preparing, and supporting non-expert users due to the richness of the technologies on the one hand and the complexity of urban issues on the other hand. Special methods of cooperating with users in preparing and expressing their perspective on an urban renewal project will be developed and tested.

Diversity and relevance of user created content

Content creation is a crucial issue in WP6 and preparing content (in the right format and technical quality) is extremely time consuming. Apart from the panoramas, which are created by TUW, content for the workshop in Sainte-Anne was mainly provided by students who had been involved in a small project. The same holds for the TGI workshop, in which we used architectural models and textures provided by student projects. In this second workshop, participants were also supported in creating their own content ,on the fly' in the form of sketches (for a description see D6.2), which enabled them to express their imaginations and anchor them in the ,real' urban space. On the whole, content creation is still dominated by the architectural perspective.

We clearly see the need to develop ways of preparing panoramas as well as content from the perspective of different stakeholders - e.g. work with cultural probes, produce 'expressive content' (e.g. sound probes and visualizations representing the experiences and feelings of the community of residents and others). This will, however, require intense cooperation with different stakeholder representatives in the preparatory phase for each workshop.

Amount and nature of feedback

As can be seen from the detailed descriptions in D6.2, we received valuable feedback from users in all three participatory workshops. Data analysis was carried out collaboratively in the team, with attention to the details of participants' interactions (as revealed in selected video clips) and to the intense discussions that took place during the workshop sessions, where participants addressed questions of the project – which interventions to carry out – but also commented on features of the tools and on their potential role in urban planning. In this way we can base our re-design decisions in an analysis of video observations as well as in comments and suggestions of workshop participants.

Common criteria for all showcases

Conformance with concept map

The prototypes and application concepts developed in showcases address more of half of the issues contained in the Concept Map of WP3;

Our analysis of the presence and interaction aspects we emphasize the relevance of:

- Dynamic representations (flow, movement, sketching on a scene)
- Characteristics of the content (fuzziness, stimulating combinations of realistic and abstract, narrative and expressive content)
- Agency (participants' co-constructing, performing, dynamically enacting MR scenes)
- Sense of place and culture
- Materiality (the engaging capacity of objects)
- Spatial aspects (spatial alignment of tools and views, scale/depth/volume, orientation, and so forth).

Conformance with technologies developed

The prototypes are based primarily on WP4/5 technology

The prototypes and technology probes were developed based on technologies that were produced in WP4 and WP5 - some examples are: integration of panorama and live video streams, PTU, Middleware, OpenTracker, HMDB and the different interaction modules of the ColorTable framework. Also the tracking technology for the ColorTable is based on work performed in WP5 (AAU).

Collection of user group feedback

Feedback is collected from at least one independent user group and one independent group of stakeholders

We in all three participatory workshops collaborated with independent users (stakeholder representatives), such as architects connected to the urban project itself, representatives from involved local authorities, and 'residents' (e.g. doctors, administrative personnel in the Sainte-Anne).

Dissemination

3 conference and 1 workshop paper were submitted and accepted.

2.6 WP7 Showcase Activity: Large-Scale Events

The main criteria of success for WP7 are to be able to demonstrate novel mixed reality applications for visitors for large scale events. The success will depend on the ability of IPCity to deliver technology prototypes which support individual and group activities that support group co-presence and the engagement to the event. Additional criteria:

- The number of city events in Helsinki in which the prototypes will be evaluated
- The number and variety of users that can try out the showcase prototype. Starting from a minimum of six per event and application.
- The ability of the prototypes to provide continuous support during the event, and to be useful before or after the event.

In this report we evaluate the progress of the workpackage 7 the IPCity showcase on "Large Scale Events". In this second year M12-M24 WP7 had to re-design the demonstrators, create a new version of demonstrator and carry out a new round of field trials.

The re-design has successfully moved forward the demonstrator with more articulated and substantially new mixed reality application in compare to year 1. The current demonstrators follow the plan of having a mobile, an installation and a pervasive component. In all components substantial advancement has been made.

- The mobile component has moved beyond CoMedia which was already field trialed in year 1 therefore WP7 has moved forward to investigate the augmented map lens as a new mobile component.
- The installation component has concretized in the CityWall a large multitouch urban display which was the object of extensive field trials.
- Finally some prototype development has interested Illuminate which finally had a first prototype version.

As in the year 1, the demonstrator has three components at different development status. The aim is to proceed by field trialing the component when it is ready and to move ahead to new concepts when a prototype has exhausted its research potential.

The approach of having three components in the demonstrator makes it possible to address many aspects of experience, media and of urban settings. We discuss in D3.3 how we are able to address more than half of the concept map through mobile, pervasive and installation components.

WP7 has been successful in using for each component basic technologies from WP4-5. Multitouch displays (WP4), pervasive interfaces and middleware (WP4/5), Augmented Map Lens (WP4) and (WP5).

Feedback has been collected from visitors and citizens and is reported in D7.2 along with an appendix on collaborating with event organizers.

The number of city events in Helsinki in which the prototypes will be evaluated.

Below a summary table of field trials and users, more details in WP7 D7.2.

The showcase succeeded in carrying out field trials in three different large-scale events in Helsinki. In addition the showcase had and is having a permanent installation in Lasipalatsi, Helsinki.

CityWall	May-July 07	City installation in cooperation with Cultural Office	http://citywall.org	Average 1000 per week
CityWall + mobile	May 2007	Eurovision , song competition	http://www.eurovision.tv/index.php	8 users
CityWall + mobile	June 2007	Samba Carnival	http://www.samba.fi/?lang=en	6 users
CityWall	August 2007	Juhlaviikot, Helsinki festival, Night of the arts	http://www.helsinginjuhlaviikot.fi/	General Public
CityWall	Current	City installation in cooperation with Cultural Office	http://citywall.org	General Public

WP7 has submitted to conference papers both of which have been accepted:

Peter Peltonen, Antti Salovaara, Giulio Jacucci, Tommi Ilmonen, Carmelo Ardito, Petri Saarikko and Vikram Batra, "Extending Large-Scale Event Participation with User-Created Mobile Media on a Public Display. Best Paper Award ACM MUM 2007 Mobile and Ubiquitous Multimedia Conference.

Peter Peltonen, Esko Kurvinen, Antti Salovaara, Giulio Jacucci, Tommi Ilmonen, John Evans, Antti Oulasvirta, "It's Mine, Don't Touch!": Interactions at a Large Multitouch Display in a Urban Setting. Accepted to ACM CHI 2008.

The multitouch display was the object of demonstration in a B2B event of the advertising sector in August 2007 in Germany.

In addition the CityWall has been turned into a permanent installation coming in contact with several thousands citizens and visitors. In particular in the Helsinki Festival the CityWall was part of the official program of the night of the Arts and appeared in the National News paper Helsingin Sanomat as well as in the program of the event. The CityWall appeared in several media internationally, Design Week UK, Casamica Italy (magazine of Corriere della Sera), and Italian National Television Rai Tre in the news, Italian radio the first channel interview.

The CityWall attracted a lot of attention also in the web. Our site <http://citywall.org> received more than 40 000 contacts. A video was posted in YouTube, CityWall was referenced in a variety of important websites including slash.com.

The CityWall was reported in a large number of news sites and blog around the planet. See appendix.

We received requests from all over the world to create similar installations. We also created a start-up to commercialize the technology <http://www.multitouch.fi> three of the researchers that worked in WP7 have founded the company. The company is seeking funding, has successfully negotiated IPR with the University and is having first customers.

Because of a variety of issues we suggest this workpackage is re-defined with a new topic. Here are the main reasons::

- The exceptional success of the impact of WP7 Large-Scale Event. This workpackage achieved the highest success possible more attuned with the end of the project, hence the need to re-define the WP.
 - Several publications in the best publication forums including best paper awards.
 - Inclusion in official programs of events, participation in all most important Helsinki Events

- Public Installation with tens of thousands users
- Start-up company as the most successful exploitation
- The volume of publications already published on the subject in HCI field by the group on Large –scale events
 - The research group already published extensively in the best journals and conferences on Large-Scale Events making it harder in the future to continue on this topic as only incremental publishing will be possible which is hard to get accepted.
- Start with a new and fresh brief to keep the creativity level high
 - After this big success the WP needs a new brief to raise the creativity potential
- The problem of events being temporarily bound
 - The problem that is experienced with events is that they last only few days and therefore are not ideal for trials as they set strong constraints on the timing and the extend of trialing for example NO LONGITUDINAL STUDIES are possible.
 - On the other hand we showed the potential of having a permanent installation.
- The fact that the most important issue of Cities today is not addressed in IPCity namely Environmental awareness
 - This is maybe the most important reason. As all the city organizations and the EU shows in the 7th Program the most important topic is now Environment and IPCity should take action by directing one of its showcases to Environmental Awareness.

For this reason WP7 in months 25-38 in the Implementation Plan WP7 will be redefined as “Environmental Awareness”.

Common criteria for all showcases

Conformance with concept map

The prototypes and application concepts developed in showcases address more of half of the issues contained in the Concept Map of WP3

The approach of having three components in the demonstrator makes it possible to address many aspects of experience, media and of urban settings. We discuss in D3.3 how we are able to address more than half of the concept map through mobile, pervasive and installation components.

Our analysis of the presence and interaction aspects we emphasize the relevance of:

Augmented experience of urban environment

Simplicity: that the technology is available to every participant of the event regardless of their gender, age or language they speak

Ambience: providing a richer sense of the urban environment.

Mixed-reality configuration: e.g with the multi-touch public display, allowed users to have panorama view to the events.

Purposeful activities: acting as a stage where the users could express themselves

Conformance with technologies developed

The prototypes are based primarily on WP4/5 technology

WP7 has been successful in using for each component basic technologies from WP4-5. Multitouch displays (WP4), pervasive interfaces and middleware (WP4/5), Augmented Map Lens (WP4) and (WP5).

Collection of user group feedback

Feedback has been achieved from many instances of public exhibition: Helsinki City installation in cooperation with Cultural Office, Eurovision song competition, Samba Carnaval, Juhlaviikot, Helsinki festival, Night of the arts, and Helsinki City installation in cooperation with Cultural Office. Participants included students in computer science or in communication studies, and spectators were also recruited at the public events.

Dissemination

3 conference papers were submitted and accepted. Various blogs, a YouTube video, discussion on lists and web sites have appeared, discussing in particular CityWall.

2.7 WP8 Showcase Activity: Time Warp

The expected result of this showcase is a Mixed Reality application that allows collaborative experience and gaming in the past, presence and future of a city across the boundaries of different media channels and interaction devices. The involvement of the users into the game play will serve as an indicator how successful the TimeWarp game is. Another success criterion is the awareness of travelling through the time. The individual indicators related to the Time Warp show case are:

- The number of (non IT-affine) users
During the field trials in summer, we conducted 13 test runs with 24 participants, whereas only 4 were non IT-affine. The participants were students, IT-professionals and tourist guides.
- The 'quality of presence' (using method and tools of WP3)
Due to the poor tracking quality sense presence could not be accurately measured. The position of the player was not precise enough thus the superimposed virtual objects were often at the wrong position or even floating around, because of instable GPS data.
- The amount of engagement and collaboration
During the game, the participants felt engaged in the experience. The current prototype doesn't support any multi-user functionality, where the players could collaborate with each other. Furthermore, the players did not collaborate with non-game participants, probably because they were aware of the responses from non-players in particular the strange views people had of them.
- The amount of work to adapt the application to a different location
To play TimeWarp in another city doesn't require a lot of work. The challenges have to locate to another situation, but it will be feasible due to the MRIML-based description. The most effort might be to adjust the content of some challenges to the new city. It mean a high amount of work especially in modelling the 3D objects and redesign the action.

Common criteria for all showcases

Conformance with concept map

The prototypes and application concepts developed in showcases address more of half of the issues contained in the Concept Map of WP3;

Our analysis of the presence and interaction aspects we emphasize the relevance of:

- Dynamic representations (flow, movement, sketching on a scene)
- Characteristics of the content (fuzziness, stimulating combinations of realistic and abstract, narrative and expressive content)
- Agency (participants' co-constructing, performing, dynamically enacting MR scenes)
- Sense of place and culture
- Materiality (the engaging capacity of objects)
- Spatial aspects (spatial alignment of tools and views, scale/depth/volume, orientation, and so forth).

Conformance with technologies developed

In the first prototype we used several technologies developed in WP4/5. Some examples are: Mobile AR system and AuthOr.

Collection of user group feedback

For the presence research, we developed a questionnaire which also includes the collection of feedback.

City specific feedback was also gained by involvement and collaboration with tourist guides.

Dissemination

- 1 Journal Paper was submitted and accepted.
- 1 Workshop Paper was submitted and accepted.
- 1 Conference Paper was submitted and accepted as paper.
- 2 research posters were submitted and accepted.

2.8 WP9 Showcase Activity: City Tales

Based on the reviewer feedback we conducted a detailed evaluation of the user generated content collected from the StreetBeat application. This changed the criteria for success of the City Tales showcase in the following way:

- We split the evaluation of StreetBeat and Leo's Adventure and conducted a field trail for StreetBeat and a Pear Study for Leo's Adventures.

The individual indicators related to the City Tales showcase are:

- StreetBeat
- Number of users
 - 25 mainly technology affine, only 5 less affine users
- The 'quality of presence' (using method and tools of WP3)
 - The evaluation approach adopted within WP9 explicitly addresses a number of the issues within the presence concept map, with particular emphasis on how these issues shape the users sense of where they are feeling presence.

The sense of where being taken to mean either the real, augmented elements or a combination of the two. The amount of engagement and collaboration

- 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 9 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 user's sense of place and presence.
- The created Content
 - During the study we left it up to the users to take pictures and by doing so leave traces of their experience behind. Users responded to that option differently some took no pictures, others just a view what appears to be pictures of their favorite spot. Other users have taken up to 24 pictures in a 1 hour tour, like e.g. User D who seems to have created a picture journal and left a remarkable trace behind, rather than just taking pictures of his favorite spots.
- Leo's Adventures
 - Content Creation
 - In order to enable the user to create MR content we had to create an easy to use and understand 3D character that could be animated and placed into the environment selected and produced by the users. A considerable research went into the character animation which is detailed in D 9.2.
 - The second challenge was to create a user interface that would allow the users to perform simple post production tasks without detailed multimedia skills and software. We developed a flash based web client with was evaluated by 5 experts from a usability point of view
 - No peer study made

Common criteria for all showcases

Conformance with concept map

The prototypes and application concepts developed in showcases address more of half of the issues contained in the Concept Map of WP3;

For analysis of the presence and interaction aspects for StreetBeat we emphasize the relevance of:

- Sense of place and culture
- Urban rhythms movements flow
- Following a Path
- MR Configurations (Directness, immersion, reality)
- Social Interaction
- Sound Icons

And for the development of the Leo's Adventures prototype we mainly focused on the multimodality which led to the extension of the concept map to the dynamic representation of 3d characters.

Conformance with technologies developed

The prototypes are mainly based on WP4&5 technologies some examples are the Hypermedia DB, Computer Vision tracking and AR visualization tools.

Collection of user group feedback

For the presence research, we developed a questionnaire which also includes the collection of feedback, video reports and in addition we help a peer evaluation of the new prototype Leo's Adventures for prototype development purposes.

Dissemination

3 conference papers were submitted and 2 were accepted. One conference poster was submitted and accepted

3 Management assessment

In reporting on progress with its management the consortium will provide information and data on the following:

Quality of being on time regarding milestones and deliverables

Based on the monthly internal progress reports in combination with the monthly Executive Board phone conferences all delays regarding milestones and deliverables are identified immediately.

In general delays were pretty small. A couple of internal reports were delayed by a couple of weeks especially due to the activities on revised deliverables which lasted until end of May. This then also influenced the development phase depending on those reports and the test period.

Regarding the year 2 deliverables all deliverables met the official deadline, while some of them were late by a few weeks (less than one month) due to individual project partners not contributing as fast or as comprehensive as expected.

Contributions to work package tasks by individual partners

Again, this issue is tracked as part of the internal progress reports and the monthly Executive Board phone meetings.

In the previous working period there were in particular issues regarding UniAK and Sony, which are reported in detail in the annual progress report (deliverable D1.7).

Contributions of work packages to presence and mixed reality

Please see section 1.2.2 for feedback from Scientific Board regarding this issue.

Appropriate consideration of privacy ethics and gender issues

Please see section 1.2.1 for a discussion and recommendations by the Scientific Board on these issues.

Nature and justification for adjustments

The nature and justification for adjustments to the original research work plan and/or timetable are reported in the annual progress report (deliverable D1.7). Major changes reported there include the changes regarding the members of the consortium:

- Change from SNS to SONY and implications for the project
- Adding UCam DENG as additional partner by a competitive call
- Foreseen exit of SONY from the project consortium
- Planned replacement of SONY by new partner IMAG

Effectiveness of the internal communication

The effectiveness of the internal communication between the coordinator, team leaders, supervisors, down to the individual researchers, including feedback processes is checked frequently and procedures are adapted where necessary. This includes

- the actual use of internal email lists and the shared document repository (BSCW) by individual work package participants
- the promptness and completeness of meeting agendas, minutes, etc.
- the awareness of deadlines and other important milestones

The BSCW shared workspace system is effective and efficient regarding the distribution, storing, and joint editing of any project related material (documents, papers, videos, applications, etc.). It is very well accepted by all project partners and all individuals working within the project. However, it is not used as effectively as in other projects for communication and exchange of documents with the EC and project reviewers.

In general all meeting agendas are available on time as defined in the project handbook. All meeting minutes of board meetings are usually available within one week from the meeting.

Regarding the awareness of deadlines we could observe that for particular milestones or deadlines the awareness obviously still was not sufficient or that there may be a lack of awareness regarding importance of a specific deadline. This in particular applies to deadlines regarding dissemination (contributions to the newsletter, updates to the website content), but also to internal reviews. The Scientific Board will discuss this issue at its next regular meeting to overcome the negative effects of this.

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

ipcity.eu