



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

FP6-2004-IST-4-27571

ipcity.eu

Detailed Work Plan for Months 37-51
Deliverable D1.12



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Abstract

This document represents an excerpt of the current description of work (technical annex / Annex I) of the project related to the detailed work package descriptions for project phase II (i.e. months 37-51).

It is created for planning, reviewing, and negotiation purposes between the IPCity consortium and the European Commission.

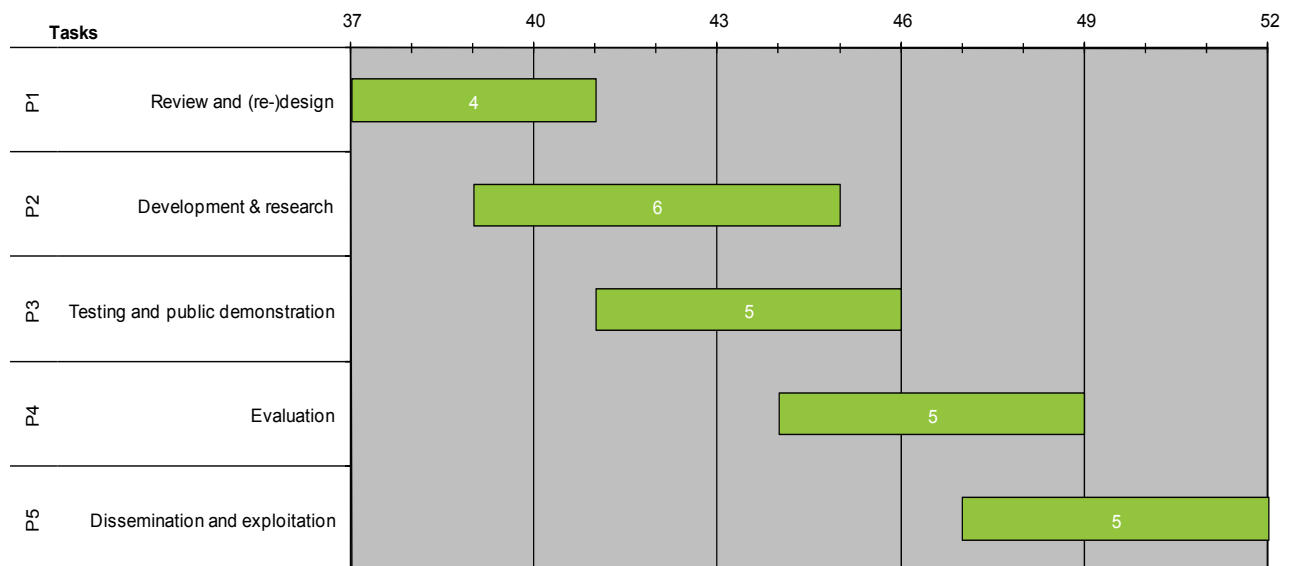
1 Detailed implementation plan – months 37 - 51

The general objective for the final 15 months of the project is to further modify and improve the research and development based on the feedback and evaluation of the tools and prototypes realized in year 3 of the project. Our principle approach – using a set of sample applications (the showcases), which are organized as sub-projects and aim to design and develop selected applications within different areas of overall project theme – has proven to be useful for the overall project as it allows us to experiment in these areas to gain a better understanding of the needs and wishes of citizens, resulting in better overall project results.

In this project phase, the final set of prototypes of the services, tools and infrastructure components developed within the research work packages will be provided to the showcases, where they will be tested and evaluated. In addition to previous development and testing cycles, the final 15 months period will end with an comprehensive dissemination and exploitation period, making the results of the project available to other researchers in particular in Europe.

In general we sub-divide the months 37-51 into the following periods:

- The analysis and (re-)design period (37-40, depending on WP)
- The development period (month 39-44, depending on WP)
- The testing and public demonstration period (months 41-45, depending on WP)
- The evaluation period (months 44-48)
- The dissemination and exploitation period (months 47-51)



The analysis and re-design phase following the evaluation phase at the end of year 3 will provide the necessary feedback to the individual showcases and research work packages for the re-design of their prototypes. Similar to the previous analysis and re-design phase in years 1 and 2, the re-design will be based on requirements relevant for particular showcases on one hand and those applying to several showcases and therefore addressed by one of the research work packages on the other hand. The research work packages will re-define their sets of tools, services, or infrastructure components to be used by the showcases. Based on the requirements from the showcases the time-line priorities for their development will be updated.

The subsequent development phase will consider the re-design and adapt and extend the prototypes according to the needs of the showcase applications. As this is the final year of the project, no new prototypes should be developed, but all previously started developments are supposed to be finished in time to be incorporated into the individual showcase applications.

The development phase will be followed by a testing period. In the testing and evaluation phases the showcases evaluate their developments as field tests or public demonstrations (see demonstration activities for details) providing the necessary feedback from outside the consortium

for the final project evaluation. The research results from the showcases will be evaluated by the research work packages to foster two-directional integration about all work packages. The research work packages will also provide trainings on tools and infrastructure components where appropriate.

In the final project phase, the dissemination and exploitation of the individual project results will be emphasized well beyond the usual amount in order to make the overall project results available to a larger community of researchers within Europe and beyond. This phase will also be used by the project partners supported by the project's scientific board to identify take-up and support actions to further exploit the project results and continue promising research activities within future projects..

Risk Analysis

In IPCity innovative new technology is developed within the research work packages, while the showcases focus on application design. Thus there always is a certain risk that the technology developed will not perfectly suit the requirements of the applications. There is also the risk that a technological development will not be finished by the time it is required by the applications. In phase 4 the showcases will finally use all new components developed within the research work packages in previous years. However, due to the innovative new technologies applied, some of them, may not be mature enough for the desired purpose. Thus some showcase may have to rely on existing technology developed in phases 2 and 3 or as used in year 3 rather than the actually desired final research prototypes. This may cause severe problems, since new technologies developed may be essential for any major progress in the showcase. Additionally, showcases having realized their earlier prototype(s) on top of existing or earlier developed technology may refuse to exchange certain parts to new tools and infrastructure components developed within the research work packages. Further, it may be impossible or very hard for individual showcases to actually use a particular technology provided since the individual components do not fit (e.g. using different programming languages or even operating systems).

Contingency Plans

We target the risk of unsuitable technology by the overall structuring of the project, which guarantees an iterative design approach with exchange of knowledge and the adaptation of goals in each of the four phases. Additional smaller iterations are facilitated allowing for design changes at an early stage. Thus the risk of missing the intended timeline is reduced to a minimum. By the frequent project meetings and the additional monthly Executive Board telephone meetings, in combination with strict reporting, such delays are discovered very early, resulting in appropriate early plan adaptations. We address the start-up problems described above by ensuring that in each showcase the technical development partners providing a baseline tools or infrastructure are involved. We additionally lower this risk by the tutorials to be provided by these project partners at the kick-off conference. The close interaction and regular exchange between the research work packages and the showcases will also ensure that the technology developed can easily be integrated and really provides an appropriate additional value to these showcases. The interoperability issues are additionally supervised by the scientific committee. We further try to provide technological alternatives for all mission-critical components. This is also reflected in the current and anticipated members of the consortium.

1.1 Work Planning

This sub-section will show the timing of the individual work packages as well as the timing of the major tasks within the individual sub-projects (research themes and showcases) within the months 37-51 of the project.

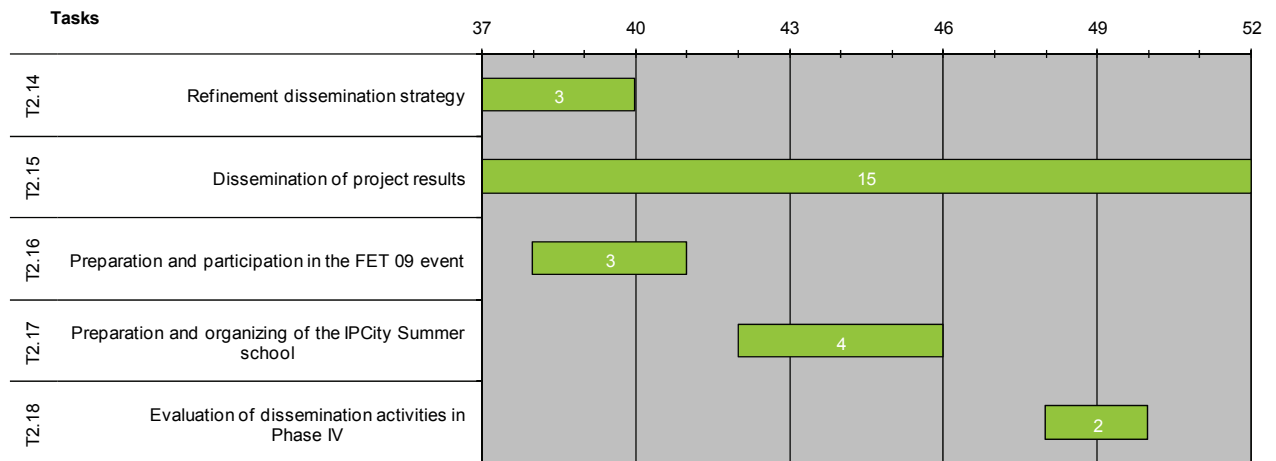
Overall Gantt Chart (months 37-51)



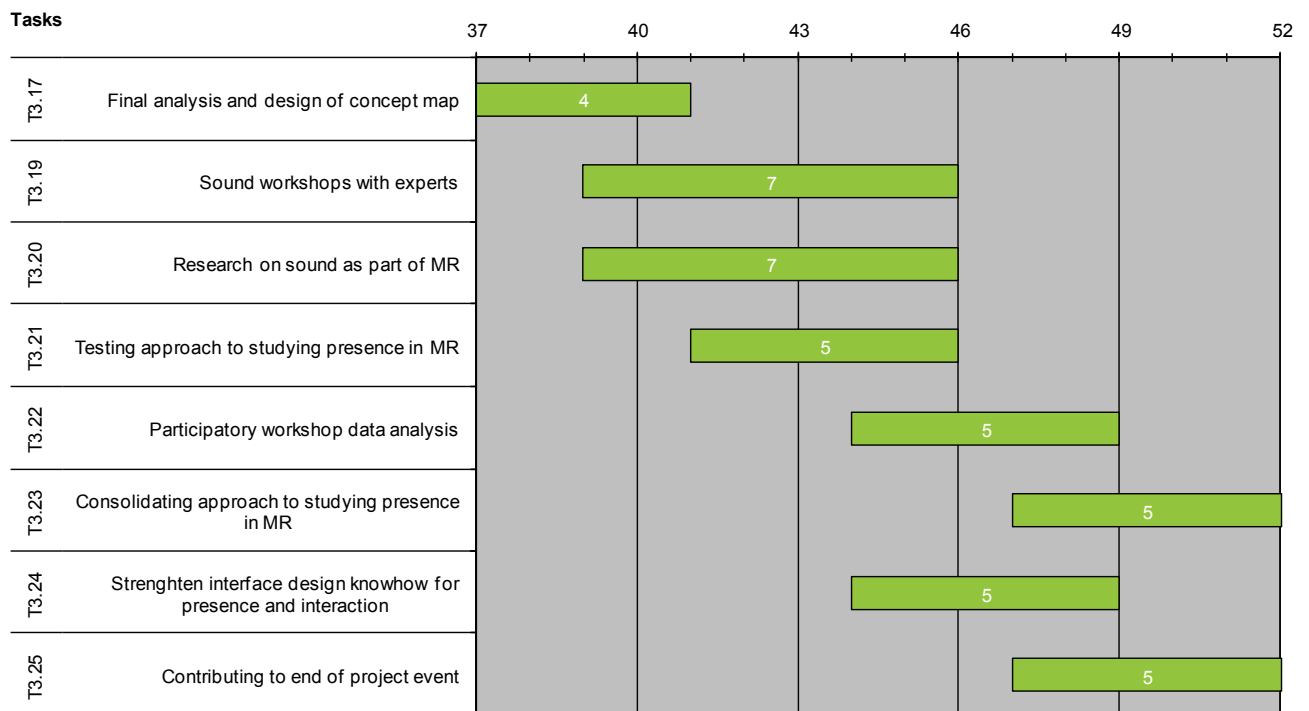
Gantt Chart on WP1 Tasks (Consortium and Project Management)



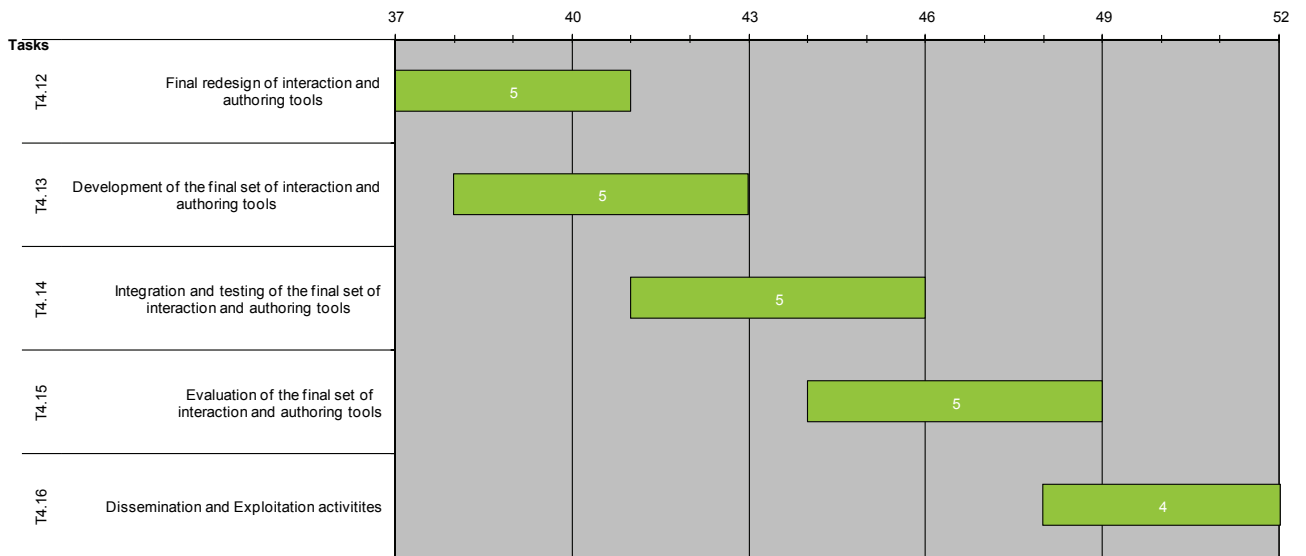
Gantt Chart on WP2 Tasks (Dissemination and Knowledge Management)



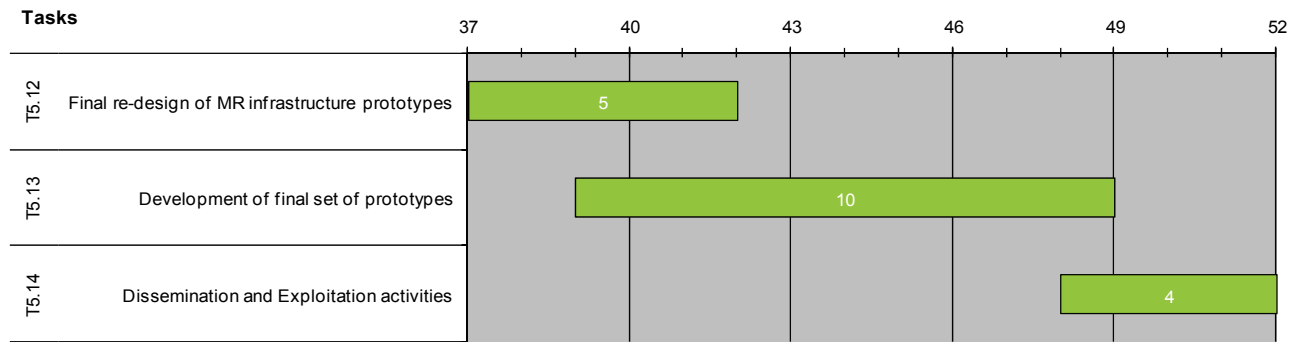
Gantt Chart on WP3 Tasks (Cross-Reality Presence and Experience)



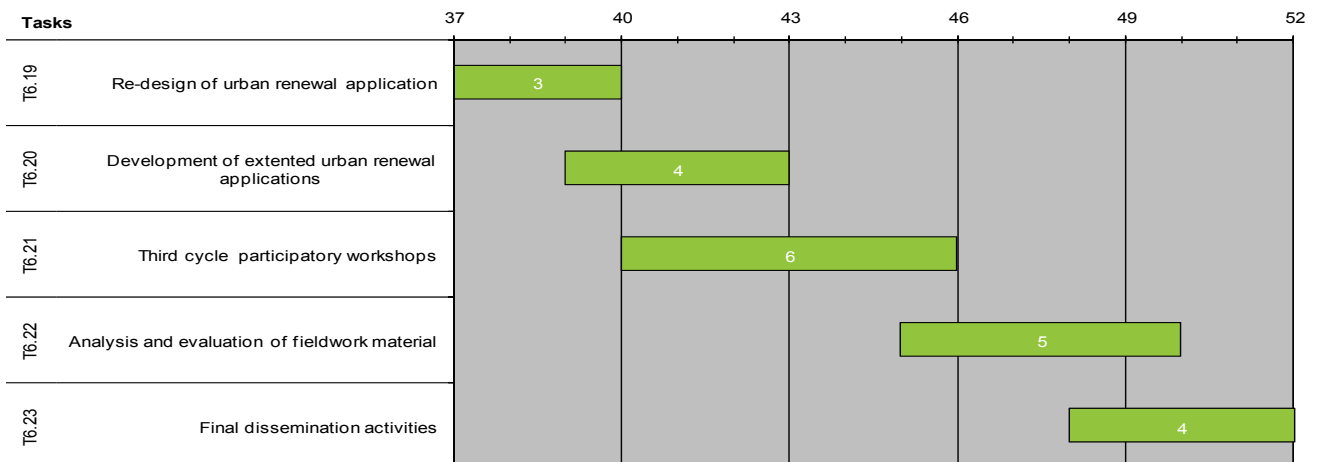
Gantt Chart on WP4 Tasks (Cross-Reality Interaction and Authoring Tools)



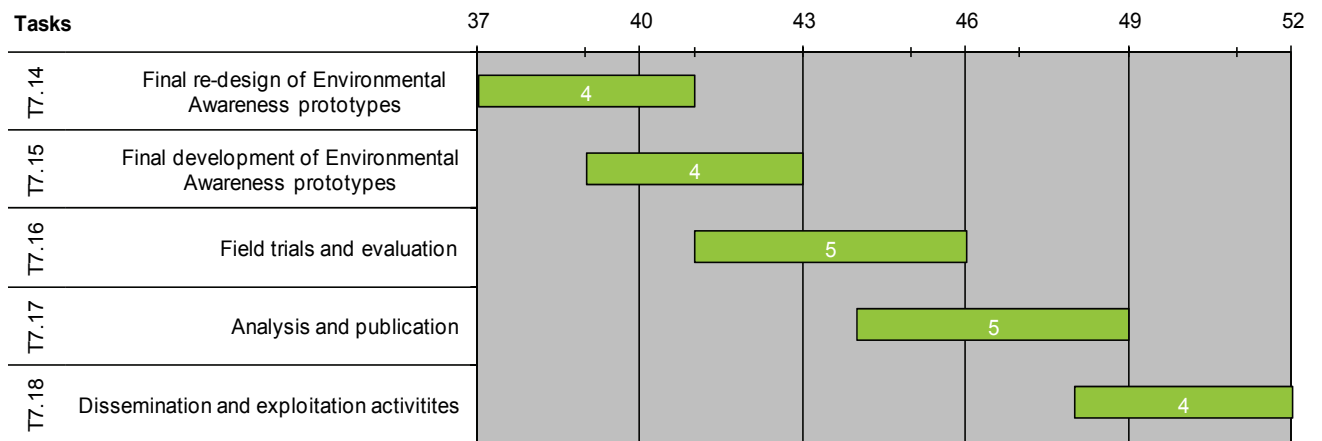
Gantt Chart on WP5 Tasks (Mixed Reality Infrastructure)



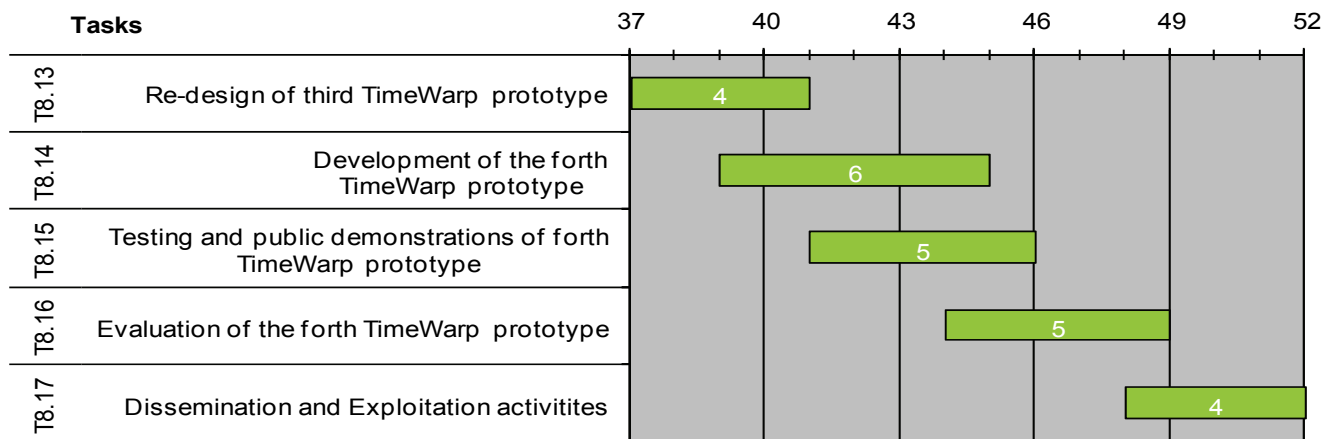
Gantt Chart on WP6 Tasks (Urban Renewal Showcase)



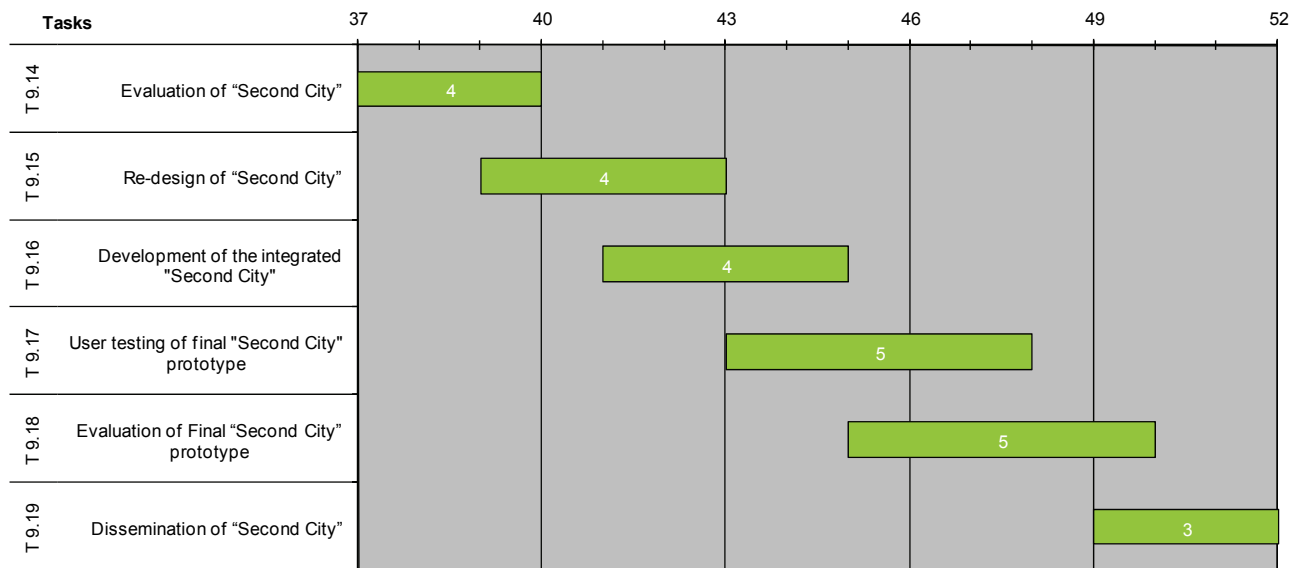
Gantt Chart on WP7 Tasks (Environmental Awareness Showcase)



Gantt Chart on WP8 Tasks (Time Warp Showcase)

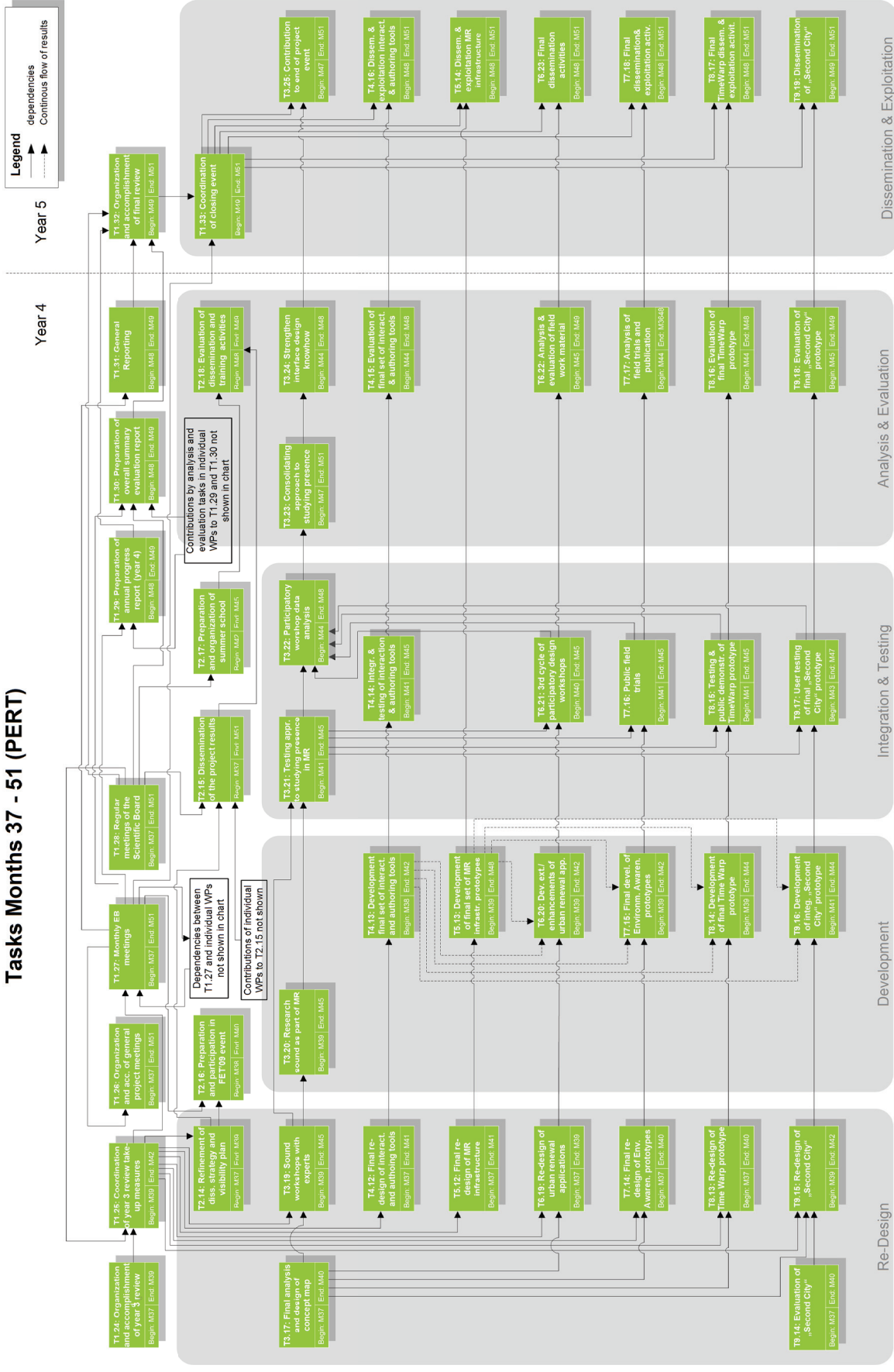


Gantt Chart on WP9 Tasks (City Tales Showcase)



1.2 Project components and interdependencies

Tasks Months 37 - 51 (PERT)



Workpackage list (15 month plan)

Work-package No ¹	Workpackage title	Lead contractor No ²	Person-months ³	Start month ⁴	End month ⁵	Deliverable No ⁶
1	Consortium and Project Management	1 (FIT)	16	0	51	D1.14 D1.15
2	Dissemination and Knowledge Management	5 (UOulu)	13.5	0	51	D2.8
3	Cross-Reality Presences and Experience	2 (TUW)	26.4	0	51	D3.4
4	Cross-Reality Interaction Tools	1 (FIT)	28.5	0	51	D4.4
5	Mixed Reality Infrastructure	3 (TUG)	67.2	0	51	D5.4
6	Showcase: Urban Renewal	2 (TUW)	37.2	3	51	D6.4
7	Showcase: Environmental Awareness Activities	8 (TKK)	28.45	25	51	D7.4
8	Showcase: Time Warp	1 (FIT)	34.45	3	51	D8.4
9	Showcase: City Tales II	12 (IMAG)	47.35	25	51	D9.4
	TOTAL		299.05			

Please note: This table sums up the person months for all activities, i.e. management, RTD, training, demonstration and non-billable additional efforts by AC partners.

¹ Workpackage number: WP 1 – WP n.

² Number of the contractor leading the work in this workpackage.

³ The total number of person-months allocated to each workpackage.

⁴ Relative start date for the work in the specific workpackages, month 0 marking the start of the project, and all other start dates being relative to this start date.

⁵ Relative end date, month 0 marking the start of the project, and all ends dates being relative to this start date.

⁶ Deliverable number: Number for the deliverable(s)/result(s) mentioned in the workpackage: D1 - Dn.

Deliverables list (15 months plan)

Deliverable No ⁷	Deliverable title	Delivery date	Nature ⁸	Dissemination level
D1.14	Annual progress report (Phase 4)	49	R	PU
D1.15	Overall Evaluation summary report	49	R	RE
D2.8	Report on dissemination, visibility and training activities during Phase IV	49	R	PU
D3.4	Consolidated approach to studying presence and interaction	48	R	PP
D4.4	Final Prototypes of interaction and authoring tools	48	P, R	RE/PU
D5.4	Final Prototypes of MR infrastructure components	48	P, R	RE/PU ⁹
D6.4	Final prototype of Urban Renewal applications	48	P, R	RE/PU
D7.4	Final Environmental Awareness Demonstrator Report	48	P, R	RE/PU
D8.4	Final Prototype of Time Warp application.	48	P, R	RE/PU
D9.4	Final Demonstrator of City Tales II application "Second City"	48	D, R	RE/PU

⁷ Deliverable numbers in order of delivery dates: D1 – Dn

⁸ Please indicate the nature of the deliverable using one of the following codes:

R = Report

P = Prototype

D = Demonstrator

O = Other

⁹ RE/PU refers to restricted regarding access to prototype software/hardware, but public presentation/demonstration of prototypes and public access to corresponding reports.

Workpackage description (15 months plan)

Workpackage number	1		Start date or starting event			Month 0
Workpackage title	Consortium and project management					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	8.6	3.1	0.8	0.5	0.7	0.3
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0	1	0.5	0.5	0	

Objectives

The main objective of this work package is the executive and scientific management, and administration of the overall project. This is performed by the executive board, the scientific board, and the project administration (the project office).

Description of work

- T1.24 (Months 37-39): Organization and accomplishment of the year 3 project review
- T1.25 (Months 39-42): Take-up measures regarding year 3 project review
- T1.26 (Months 37-51): Organization and accomplishment of 3-4 general project meeting per year
- T1.27 (Months 37-51): Monthly telephone conferences of the Executive Board. In person meetings of the Executive Board at each general project meeting.
- T1.28 (Months 37-51): In person meetings of the Scientific Board at each general project meeting. Particular tasks include ensuring all WPs are relevant to presence and mixed reality and the consideration of privacy ethics issues.
- T1.29 (Months 47-49): Preparation of the annual project progress report for year 4
- T1.30 (Months 47-49): Preparation of overall project evaluation summary report
- T1.31 (Months 48-49): Reporting (financial, management)
- T1.32 (Months 49-51): Organization and accomplishment of the final project review
- T1.33 (Months 49-51): Preparation of the project closing event (workshop / conference)

Deliverables

- **D1.14 (Report) – Month 49:** Annual reports / project progress reports (Phase 4)
- **D1.15 (Report) - Month 49:** Overall Evaluation summary report

Milestones and expected result

- M1.12 – Month 39: Year 3 project review
- M1.10 – Month 49: Evaluation results from work packages
- M1.11 – Month 51: Final project review and end of project event

Workpackage number	2			Start date or starting event	Month 0	
Workpackage title	Dissemination and knowledge management					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	5	0.6	0.5	3	0.7	0.7
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0.5	1	0.5	1	0	

Objectives

The aim of this work package is to ensure maximum dissemination and impact for the results achieved during the project both internally within the project and externally in relation to the scientific community, other stakeholder and information society in general. The partners aim at taking full-scale advantage of the results achieved in the project: the business partners as their business activities and the academic partners as building blocks of their research competence.

Description of work

- T2.14 (Months 37-39): Refinement of the dissemination strategy and knowledge management plan for the last project phase
- T2.15 (Months 37-51): Dissemination of project results
- T2.16 (Months 38-40) Preparation and participation in the FET 09 event.
- T2.17 (Months 42-45) Preparation and organizing of the IPCity Summer school
- T2.18 (Months 48-49): Evaluation of dissemination activities in Phase IV

Deliverables

- **D2.8 (Report, Annex to the project handbook) – Month 38:** Revised dissemination strategy and knowledge management plan
- **D2.9 (Report) – Month 49:** Report on dissemination, visibility and training activities during Phase III

Milestones and expected result

- M 2.11 – Month 38: Revision and adaptation of dissemination strategy finished
I2.3 (Internal report): Dissemination strategy and knowledge management for Phase III
- M 2.12 – Month 40: FET 09 exhibition participated
- M 2.13 – Month 45: Summer school organised
- M 2.14 – Month 49: Internal evaluation reporting on dissemination activities (D2.9 and contribution to D1.15 – Evaluation Summary Report of Year 3)

Workpackage number	3		Start date or starting event			Month 0
Workpackage title	Cross-Reality Presence and Experience					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	3	13.7	0	2	0.7	3
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	3	0	0	1	0	

Objectives

The objectives of this WP are

- To define a set of multiple methods appropriate for triangulation in data collection on presence and interaction in MR environments
- To analyze data from field trials in the four showcases, achieving a deeper understanding of how mixed reality environments influence the experience of presence and how this enables novel forms of social interaction, of exploration and understanding
- To define a conceptual framework in support of designing 'technologies of presence' that inform the design of interface mechanisms in support of presence within the project and guide the integration of these technologies into real world settings
- To evaluate this framework using data from field trials.

The specific research and development issues for Year 4 are:

- To further consolidate and deepen the IPCity approach to studying presence in mixed reality based on a detailed analysis of fieldwork examples across showcases
- To perform further in-depth conceptual and empirical studies of sound as part of mixed reality

To further detail and improve the 'design guidelines' of mixed reality

Description of work

- T3.17 (Months 37-40): Further analysis of evaluation results and final design of the concept map
- T3.19 (Months 39-45): Sound research: further small sound workshops with sound experts
- T3.20 (Months 39-45): Sound research: further research on sound (expressive sound, sound as part of interaction design) as part of mixed reality
- T3.21 (Months 41-45): Further testing of IPCity approach to studying presence in mixed reality in participatory workshops, field trials, and other evaluation events with technology prototypes in cooperation with all showcases
- T3.22 (Months 44-48): Analyze data from participatory workshops, field trials, and other evaluation events
- T3.23 (Months 47-51): To consolidate IPCity approach to studying presence in mixed reality with special attention to ethical and gender issues
- T3.24 (Months 44-48): To extend, deepen, and systemize knowledge on interface design in support of presence and interaction based on evaluation results ('design guidelines')
- T3.25 (Months 47-51): To contribute to preparing and carrying out end of project event.

Deliverables

- **D3.5 (Report) – Month 48:** Consolidated approach to studying presence and interaction.
- Consolidated IPCity approach to studying presence and interaction, based on research findings from all four showcases, and guidelines for interface design

Milestones and expected result

- **M3.10 – Month 48:** Joint analysis of research findings in all four showcases, consolidated IPCity approach to studying presence in mixed reality, and guidelines for interface design completed, internal evaluation reporting (contribution to D1.12 – Evaluation Summary Report of Year 4)

Workpackage number	4		Start date or starting event			Month 0
Workpackage title	Cross-Reality Interaction and Authoring Tools					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	13	5	4	6	0	0
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0	0	0	0.5	0	

Objectives

The objective of this work package is the development of a set of generic tools for supporting interactions, design of multi-modal user interfaces and authoring of interactive Mixed Reality environments. After the development of the initial set of tools used within the showcases, now these tools will be redesigned based on the experience and the results of the evaluation from the showcases. Additional tools will be designed and developed according to the needs of the showcases. The redesigned and new tools will be delivered to the showcases to be included within phase two.

The focus of our work will be on the following topics and tools due to demands from the showcases:

- MapLens (augmented maps on mobile devices over paper maps): Further development based on the results received from field trials.
- Multi-Touch Display: Further development based on the results received from field trials.
- Mobile Media Collector (MMC): The development is advancing after the Fall 2008 trials to phase 2, based on trial feedback. Further field tests and trials with new versions will be conducted during Spring and Fall of 2009.
- MMS Entrance: Further trials integrated to Multi-Touch Display.
- ColorTable: Further development including all the result from the user workshops and further trials and user workshops.
- UrbanSketcher: Further development based on results from further trials and user workshops.
- Audio / Video Streaming: Extending the Device Abstraction Layer (DEVAL) to support audio and video streaming. Designed and developed a audio and video streaming device abstraction
- Authoring and Orchestration Interface: Developing a 3D authoring interface based on Interaction Prototyping and improving upon concepts developed in AuthOr. Further, continued development on Interaction Prototyping (Interactive Bits) visual editor.

Description of work

- T4.12 (Months 37-40) Final redesign based on the experience, the results of the evaluation, and the adapted or extended requirements from the showcases that used the third set of tools.
- T4.13 (Months 39-42) Development of the final set of interaction and authoring tools
- T4.14 (Months 42-45) Integration in showcase application, testing and use as part of public demonstrations (depending on individual technology and showcase demonstrations) of the third set of interaction and authoring tools.
- 4.15 (Months 44-48) Evaluation of the final set of interaction and authoring tools.
- 4.16 (Months 48-51) Dissemination and Exploitation activities.

Deliverables

- **D4.4 (Prototype + Report) – Month 48:** Final prototypes of interaction and authoring tools.

Milestones and expected result

- M4.7 – Month 40: I4.7 (Internal Report): Final design specification of the interaction and authoring tools.
- M4.8 – Month 48: Internal evaluation reporting on final set of interaction and authoring tools (contribution to D1.15 – Overall Evaluation Summary Report of Year 4)

Workpackage number	5		Start date or starting event		Month 0	
Workpackage title	Mixed Reality Infrastructure					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	12	3	17.7	4	0	0
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0	14.5	15	1	0	

Objectives

The prototypes give promising results concerning hardware and software developments. The software components for augmented and mixed reality applications on different mobile devices will continue according to the requirements of the various emerging showcase applications. In this context, sub-notebook but also UMPC-based as well as smart phone-based settings seem to be useful for different showcase scenarios. Therefore, we will continue the core development for these kinds of devices. In addition, a persistent collaborative database and message passing seems to be inevitable in order to exchange data between various devices. We will further work on the localization and tracking of outdoor users by fusing different types of tracking modalities such as GPS, inertia and vision-based systems. Specifically, we will work on software and hardware infrastructure for the following issues:

Sketcher usability assessment

The Sketcher has been used in the MR Tent as part of multiple workshops with the main goal of collecting qualitative data on MR presence and related issues, relying mostly on ethnographic observation. However, the usability of the Sketcher has been neglected. It is therefore planned to perform assessment of the Sketcher's usability through a quantitative evaluation. In particular, various assumptions about the 3D interaction in the Sketcher should be scrutinized.

As a meaningful test setup, we anticipate to use a table with a flat map and an architectural scale model consisting of block-shaped houses. The map will be tracked with a natural feature tracker, using a PC and handheld webcam. The house models will partially occlude the map, but the tracking will still work in most cases. The scene will be presented in a video see-through MR mode. A laser pointer can be used as the input device. Since both laser pointer and camera can be moved, the interaction is limited to physical surfaces. This makes the interface tangible.

GPU Sketching

The Sketcher will be rewritten to use advanced GPU shaders for painting, which will speed up this component significantly. This will also change the model representation and access leading to new insights on future model handling.

Performance optimization with Slow-Fast Rendering

The complex setup of the MR Tent featuring the components ColorTable, Panorama and Sketcher has proven difficult because of the variety of computer graphics tools used. In particular, these components can run at very different frame rates. Moreover, the Sketcher will be rewritten to use advanced GPU shaders for painting, which will speed up this component significantly but is likely to leave very little room for other graphical components. We will therefore refactor the MR Tent graphics subsystem into a mini-cluster composed of two PCs acting in parallel, using a slow-fast configuration with sort-last compositing.

ContentManager

Extend support for more services according to application needs. Add additional content moderation tools.

Scouting and multi-perspective MR

We will further improve and test the scouting capabilities especially the tracking quality which is crucial for a fluent and spatially correct multi-perspective MR view of the scouting stream. Furthermore an AR-Scout enables the delivery of real world imagery which can be used to evaluate virtual objects from more than a single point of view at the same point in time. Nevertheless, the AR-Scout is still limited to the physical laws of its environment. Therefore, we propose to extend the idea of AR-Scouting by introducing a virtual model which is textured from real world sources (like the video information delivered by the AR-Scout). Such a virtual model, textured with real world information is able to provide the AR application with the same navigational freedom than VR applications do.

In addition to the navigational freedom, a real world textured model allows to change the atmosphere of the AR application switching the texture's content in respect to their content's point in time. For example, using multiple real world textures on a single virtual object, which in addition are annotated with their time of acquisition, the application becomes able to switch from day time to a night atmosphere. Furthermore, almost complete real world textured scene representations also allow to remove real content from the scene without having to substitute it with virtual content. Such a tool, allows not only evaluating certain architecture in AR, but also enables the application to modify the entire situation during urban planning.

Model-based Outdoor tracking

Integrating the outdoor tracking with Vision-based localization and further extend to use Geo-referenced images as model.

Description of work

- T5.12(Months 37-41): Final re-design and re-planning
- T5.13(Months 39-48): Start of final development, testing and evaluation period
- T5.14(Months 48-51): Dissemination and Exploitation activities.

Deliverables

- **D5.4 (Prototype + Report) – Month 48::** Final prototypes of MR infrastructure components

Milestones and expected result

- M5.11 - Month 40: I5.7(Internal Report): Report on final re-design and re-planning actions

Workpackage number	6		Start date or starting event		Month 3	
Workpackage title	Showcase 1: Urban Renewal					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	1	16.4	5.7	4	1.6	6
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0	2	0	0	0.5	

Objectives

The objective of this work package is to introduce mixed reality applications in support of presence into urban renewal projects; more specifically:

- To conduct field work in urban planning environments in several European cities, involving users and researchers as reflective co-designers, from early exploring practice and visions to field trials with gradually more integrated scenarios and prototypes
- To design an application based on the *MR-Tent* infrastructure from WP5, equipped with a mixed-media workbench interface, in support of collaborative envisioning (in collaboration with WP5)
- To support users in creating visual and audial scenes using a variety of sources for multimedia content
- To develop mobile technology for public participation supporting situated content creation
- To evaluate the experiences of field trials with the technologies in real urban planning settings, with special attention to participants' experience of presence and co-presence.

Specific research and development issues for M36-51 related to these objectives are:

- To improve the role of sound to strengthen the sense of time and place of urban renewal prototypes.
- To further develop and work with rules and constraints in urban renewal applications
- To further experiment with novel forms of representation, in particular simple, abstract and atmospheric content.
- To simplify the workflow in urban renewal applications by organizing the workspace and integrating different tasks in a same flow
- To further develop the „scout“ and integrate it into the MR-Tent
- To conceptualize different ways of involving participants in the preparatory steps of the participatory workshops (cultural probes, tutorials, ...)

Description of work

- T6.19 (Months 37-39): Re-design of Urban Renewal applications and planning for the final round of participatory workshops
- T6.20 (Months 39-42): Development of extensions/enhancements of Urban Renewal applications, including sound
- T6.21 (Months 40-45): Preparation and carrying out of third cycle of participatory workshops in a complex urban project to test the final prototype of Urban Renewal applications, including the MR-Tent
- T6.22 (Months 45-49): Final analysis, evaluation of fieldwork material from participatory workshops in cooperation with WP3, WP4 and WP5.
- T6.23 (Months 48-51): Final dissemination of Urban Renewal activities

Deliverables**D6.4 (Prototype + Report) – Month 48:** Final prototype of Urban Renewal applications**Milestones and expected result**

- M6.8 – Month 39: Re-design of Urban Renewal application finished
- I6.7 (Internal Report): Report on urban renewal application re-design
- M6.9 – Month 42: Final prototypes of the Urban Renewal applications finished.
- M6.10 – Month 49: Analysis of participatory workshops and feedback to technology developers as well as WP3 completed, internal evaluation reporting of the final urban renewal application. (contribution to D1.12 – Evaluation Summary Report of Year 3)
- M6.11 – Month 51: Final project review and end of project event.

Workpackage number	7		Start date or starting event			Month 25
Workpackage title	Showcase 2: Environmental Awareness					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	0.9	0.8	4.5	5.5	0	3.7
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	13.05	0	0	0	0	

Objectives

The objective of this work package is to introduce mixed reality applications in support of presence into urban environments that support environmental awareness concepts; more specifically:

- To develop novel applications of mixed reality interfaces in the case of environmental awareness activities that will include citizens and visitors as active participants.
- Advancing the research on Presence and Engagement while focusing on environmental awareness to facilitate spatial distribution, multiple forms of input and spontaneity into urban activities.

Communication Modalities

We investigate the usefulness of:

1. A large public display *CityWall* as a means for spectators to interact with general, individual and shared co-authored information/ data visualisation
2. *Annotated Lens Map* for supporting a mobile augmented reality physical map system, implemented and tested within a location-based game scenario within the city.
3. Pervasive Computing components that are integrated into the two applications: with *CityWall* by extending how people can interact e.g SMS, MMS, online etc; with *MapLens* by building a game that requires users to move around the city.

Specific research and development issues for M37-51 related to these objectives are:

- To extend the features that support users in representing different types of content
- To support in particular non-expert users (interested and involved citizens) in generating content that expresses their perspectives and understanding.
- To get feedback from users through field trials to better understand these processes

The emphasis for months 37-51 is on field trials, research and publication.

Description of work

- T7.14 (Months 37-40): Final re-design of Environmental Awareness Prototypes
- T7.15 (Months 39-42): Refinement of final development of Environmental Awareness Prototypes
- T7.16 (Months 42-45): Field trials and evaluation.
- T7.17 (Months 44-48): Analysis and evaluation
- T7.18 (Months 48-51) Dissemination and Exploitation activities.

Deliverables

D7.4 (Prototype + Report) – Month 48: Final Environmental Awareness Demonstrator Report

Milestones and expected result

- M7.10 – Month 36: I7.6 (Internal Report): Report on Environmental Awareness events application re-design (completed M36)
- M7.11 – Month 42: Second Environmental Awareness application prototypes
- M7.12 – Month 50: 17.7 (Internal Report): Evaluation results from Environmental Awareness application work package re-design and outcomes.
- M7.13- Month 51: Final project review and end of project event

Workpackage number	8		Start date or starting event			Month 3
Workpackage title	Showcase 3: TimeWarp					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	15.05	0.6	0	0	0	1.7
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0	1	0	10.6	5.5	

Objectives

The objective of this showcase is the development of TimeWarp. TimeWarp is a pervasive mixed reality game in an urban context that allows users to experience a city in the past, present and future with a large variety of different media channels and interaction devices.

Based on the previous test runs and experiences with the latest prototype, improvements will mostly concern gameplay, game content and story structure to create a stronger perception and awareness of the real and virtual environment and thus enhance the cross-reality presence both in spatial as well as temporal terms.

The objectives for these prototypes are more specifically:

- To advance the infrastructure and game play by
 - Improving the gaming experience to get a more joyful and exciting adventure to reach a stronger identification with the situation and environment and thus enhance the cross-reality presence.
 - Further anchoring virtual content with and into reality to ensure a stronger intermingling of both game aspects for creating a coherent experience
 - Balancing the different player roles and devices, exploiting strengths and weaknesses to foster a collaborative as well as stimulating relationship between the players
- To develop and evaluate concepts and tools to gain a stronger presence experience by
 - Expanding the game content to create a richer gaming world strengthening the unique traits of all time zones
 - Increasing the narrative power of the game to draw the players more into the game, e.g. emotionally
 - Staging the game under different, unusual environments (e.g. by night or a different city) and evaluating the different findings on spatial and temporal presence

Description of work

- T8.13 (Months 37-40): Re-design of second TimeWarp prototype. Based on the analysis of the test runs, the internal evaluation and the results of WP3, WP4, and WP5, we will modify and extend the specification for the second Time Warp prototype. This may include improved interaction and collaboration functionality and additional media channels and interaction devices.
- T8.14 (Months 39-44-): Development of the third TimeWarp prototype. Based on the results on the re-design developed in T8.9 and tools and infrastructure provided by WP4 and WP5, we will develop the third TimeWarp prototype.
- T8.15 (Months 41-45): Testing and public demonstrations of third TimeWarp prototype
- T8.16 (Months 44-48): Evaluation of the third TimeWarp prototype.
- T8.17 (Months 48-51): Dissemination and Exploitation activities concerning the final TimeWarp

prototype and presence findings

Deliverables

- **D8.4 (Demonstrator + Report) – Month 48:** Third TimeWarp Prototype + Evaluation Report

Milestones and expected result

- M8.11 – Month 41: TimeWarp application re-design finished
- I8.5 (Internal Report): Report on TimeWarp application re-design
- M8.11 – Month 44: Third TimeWarp prototype
- M8.12 – Month 48: Internal evaluation reporting of the third Time Warp application prototype.(contribution to D1.15 Overall Evaluation summary report
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Workpackage number	9			Start date or starting event	Month 25	
Workpackage title	Showcase 4: City Tales (II)					
Participant id	FIT	TUW	TUG	UOulu	UniAK	UMLV
Person-months per participant:	10.75	0.6	0.3	0	4.2	1.6
Participant id	TKK	AAU	UCAM DENG	IMAG	UOC	
Person month per participant:	0	2	0	17.4	10.5	

Objectives

City Tales concentrates on creating tools and users interfaces that are easy to use and easy to understand, that meet the need of the intended user and that support users procuring mixed reality content. For City Tales the way in which a user is enabled to create a mixed reality content and stories in an urban environment is the core research interest and will drive all other related research aims and functionalities.

Separate tools have been created so far for the content creation and content browsing of singular content elements, in M37-51 we will focus on the combination of these tools and to create and retrieve mixed reality stories out of these elements.

Specific research and development issues for M37-51 related to these objectives are:

- To combine available tools to a unified SecondCity MR-tool, capable of browsing, adding and modifying content.
- To support in particular non-expert users (interested and involved citizens) in generating content that expresses their perspectives and understanding.
- To create stories from the particular content elements.
- To get feedback from users through field trials to better understand these processes.
- To disseminate results in form of exhibitions, training activities.

Description of work

- T9.14 (Months 36-39): Evaluation of "Second City"
- T9.15 (Months 39-42) Re-design of "Second City" based on the internal evaluation and the results of WP3, WP4, and WP5.
- T9.16 (Months 41-44): Development of the integrated multi-modal mobile MR application. Extension of the authoring tool to incorporate story creation.
- T9.17 (Months 43-47): User testing of the final "Second City" system prototype.
- T9.18 (Months 45-49): Final evaluation of "Second City" user testing
- T9.19 (Months 49-51) Dissemination and Training activities for the final "Second City" system prototype.

Deliverables

D9.4 (Demonstrator + Report) – Month 48: Final Demonstrator of City Tales II application “Second City”

Milestones and expected result

- M9.10 – Month 39: Internal evaluation reporting of the initial Second City application.
- M9.11 – Month 44: I9.6 (Internal Report): Second City extended prototype
- M9.12 – Month 49: Internal evaluation reporting of the final "Second City" application.

2 Project resources

2.1 IP Efforts for Months 37 – 51 of the Project

RTD Activities

RTD/Innovation activities	FIT	TUW	TUG	UOulu	UniAK	UMLV	TKK	AAU	UCAM DENG	IMAG	TOTAL PARTNERS
WP1: Consortium and Project Management	2	0.6	0.5	0.5	0.5	0.3				0.5	4.9
WP2: Dissemination and Knowledge Management	5	0.6	0.5	3	0.5	0.7	0.5			1.0	11.8
WP 3: Cross-Reality Presence and Experience	3	11.5	0	2	0.7	3	3.0			1.0	24.2
WP4: Cross-Reality Interaction Tools	13	3.2	4	5.5	0	0				0.5	26.2
WP5: Mixed Reality Infrastructure	12	3	16	4	0	0		13	15	1.0	64
WP6: Urban Renewal Showcase	1	12.2	3.5	3	1.5	4.5		1		0.0	26.7
WP7:Environmental Awareness Showcase	0.9	0.6	3.5	5	0	3.5	9.25			0.0	22.75
WP8: Time Warp Showcase	14	0.6	0	0	0	1		1		10.0	26.6
WP9: City Tales Showcase	10	0.6	0.3	0	3.0	1		1		16.0	31.9
Total research	60.9	32.9	28.3	23	6.2	14	12.75	16	15	30	239.05

Please note that the table above does not contain the additional effort by the AC partners (non-billable costs by permanent staff). This information is provided in the table below.

Additional Activities by AC and non-European Partners

Additional effort by AC partners	FIT	TUW	TUG	UOulu	UniAK	UMLV	TKK	AAU	UCAM DENG	IMAG	UoC	TOTAL PARTNERS
WP1: Consortium and Project Management		2.5	0.3		0.2			1	0.5			4.5
WP2: Dissemination and Knowledge Management					0.2			1	0.5			1.7
WP 3: Cross-Reality Presence and Experience		2.2										2.2
WP4: Cross-Reality Interaction Tools		1.8										1.8
WP5: Mixed Reality Infrastructure			0.7					1.5				2.2
WP6: Urban Renewal Showcase		2.5			0.1						0.5	3.1
WP7: Environmental Awareness Showcase							2					2
WP8: Time Warp Showcase											5.5	5.5
WP9: City Tales Showcase					0.2						10.5	10.7
Total additional AC effort		9	1		0.7		2	3.5	1		16.5	33.7

Demonstration Activities

Demonstration activities	FIT	TUW	TUG	UOulu	UniAK	UMLV	TKK	AAU	UCAM DENG	IMAG	TOTAL PARTNERS
WP6: Urban Renewal Showcase		1.2	1.2	0.5	0	1.5		0.5		0.0	4.9
WP7: Environmental Awareness Showcase		0.2	1	0.0	0	0.2				0.0	1.4
WP8: Time Warp Showcase	0.75		0	0.0	0	0.7				0.3	1.75
WP9: City Tales Showcase	0.75		0	0.0	1.0	0.6		0.5		0.7	3.55
Total demonstration	1.5	1.4	2.2	0.5	1.0	3		1		1.0	11.6

Training Activities

Training activities	FIT	TUW	TUG	UOulu	UniAK	UMLV	TKK	AAU	UCAM DENG	IMAG	TOTAL PARTNERS
WP4: Cross-Reality Interaction Tools				0.5							0.5
WP5: Mixed Reality Infrastructure			1	0.0							1
WP6: Urban Renewal Showcase		0.5	1	0.5				0.5			2.5
WP7: Environmental Awareness Showcase			0	0.5			1.8				2.3
WP8: Time Warp Showcase	0.3		0	0.0						0.3	0.6
WP9: City Tales Showcase			0	0.0				0.5		0.7	1.2
Total training	0.3	0.5	2	1.5			1.8	1		1.0	8.1

Consortium Management Activities

Consortium management activities	FIT	TUW	TUG	UOulu	UniAK	UMLV	TKK	AAU	UCAM DENG	IMAG	TOTAL PARTNERS
WP1: Consortium and Project Management	6.6										6.6
Total consortium management	6.6										6.6

Total Activities

Total activities	FIT	TUW	TUG	UOulu	UniAK	UMLV	TKK	AAU	UCAM DENG	IMAG	UoC	TOTAL PARTNERS
Without non-billable efforts	69.3	34.8	32.5	25	7.2	17	14.55	18	15	32	0	265.35
Including non billable efforts	69.3	43.8	33.5	25	7.9	17	16.55	21.5	16	32	16.5	299.05

Acknowledgements and Further Information

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

ipcity.eu