Integrated Project on Interaction and Presence in Urban Environments

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Demonstrators of Large-Scale Events Applications

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Abstract

In this report we present the demonstrators of the workpackage 7 the IPCity showcase on “Large Scale Events”. The analysis of field studies and creative work has been successful and has resulted in several application scenarios. Three scenarios have been developed into demonstrators all using different mixed reality tools and addressing different interaction and experience aspects. These are aimed at supporting spectatorship along three aspects: co-experience of the event in groups, navigating the event space and supporting the post-event experience. The showcase has produced three novel application concepts CoMedia (a mobile group media application with awareness cues and optical markers), the “Contact Wall” (a touch screen installation for groups of visitors) and Illuminate (a pervasive installation to visualize paths and social interactions). The three concepts are at different stage of development respectively prototype, demonstrator and simulation.

The showcase succeeded for the prototype of CoMedia in carrying out two field trials in two different countries in real large-scale events (WRC Neste Oil Rally Finland, co-pop Cologne, Germany). In each trial 8 spectators used the applications over the whole duration of the events and more. The data gathered of the usage of 16 users has been analyzed and has pointed to specific aspects of presence and experience in spectatorship. The work already resulted in one long paper accepted at CHI2007 “CoMedia: Mobile Group Media for Active Spectatorship”.

Intended Audience

The primary audience of this deliverable is the Project consortium and the EC.

1 Workpackage Objectives

Objectives Phase I	The objectives of this phase are to carry out field work and application development to explore how to support spectatorship by enhancing engagement to the event and co-experience in groups.
Results Phase I	In this phase we have analyzed previous field studies material. We have developed demonstrators of components for large scale events applications (mobile, installation, pervasive components). We have carried out two field trials with an initial prototype of the mobile component to support awareness and engagement of spectators.
Evaluation Results Phase I	The analysis and creative work has been successful and has resulted in several application scenarios. Three scenarios have been developed into demonstrator all using different mixed reality tools and addressing different interaction and experience aspects. The showcase succeeded in carrying out two field trials in two different countries in real large-scale events (WRC Neste Oil Rally Finland, co-pop Cologne, Germany). In each trial 8 spectators used the applications over the whole duration of the events and more. The data gathered of the usage of 16 users has been analyzed and has pointed to specific aspects of presence and experience in spectatorship.
Objectives Phase II	In the next phase we will further develop the demonstrators into prototypes and have more comprehensive trials of the large scale events applications.

2 Field Studies and Initial Concept

Large scale events are prime social, economic, and media happenings. One one their roles is to create and maintain an image of city and to promote it also internationally.even when they are organized as satellites to cities. The aim is to provide a specific experience of cities to visitors and citizens but the motivations are also economic given the variety of businesses involved. In large-scale events spectators organize themselves in groups; investing resources such as time, energy and money into co-experience something “extraordinary” set apart from everyday life. Spectators do much more than just “watch”: they ensure they are aware of other people presence and activities coordinating mobility and schedules. They both navigate and negotiate space; capturing various forms of media and other “documentations”, discussing about the event, taking part in various types of collective performances (dancing, joking, supporting etc.). We address events that are “large-scale” referring to the number of visitor and spectator (crowds), the duration that extends over days and the wide-area spatial distribution. In the showcase we aim at supporting *active spectatorship* focusing on three aspects:

- Co-experience in spectator groups – Spectators constantly look to each other to express and share experiences through a combination of verbal, performative, material, and technological means.

- Engagement to the event – beyond passive witnessing deeper cognitive and social processing of the event.

- Navigating the space – Spectators engage in a variety of activities that emphasize the spatiality of their experience coordinating revising plans with distributed members. They navigate the distributed event space planning, improvising and executing a route (including exploring, finding, evaluating, negotiating places).

2.1 Implications from field studies

We first motivate the need to support collective aspects of media use by reporting about previous field trials of a particular mobile media application in events such as festivals or sport events like rally championships. The application was developed for smart phones and supported members in contributing to media collections of the group. The multimedia messages, contributed to creating shared media albums, which we called ”Media Stories”.

We have arrived at focusing on collective use and awareness based on our findings from a field trial with a system called mGroup, a Java-based multimedia group messaging prototype that organizes user-created content and messages into shared albums that also act as chat spaces. The trial was organized at a World Championships Rally competition in Finland with a group of spectators equipped with eight smart phones. The groups consisted of people who had already decided to attend to the event before they were contacted for trying the prototype, and they were not instructed to use mGroup in any specific way. This was done to ensure that the activity observed was as natural as possible.

Figure 1 *Pictures from the field trial with mGroup: Left: A group of users chatting and using phones at a rally track; Center: A message posted by a user through mGroup; Right: A group of users having fun when trying to make sense of the message; primary*

methods were shadowing, interviewing and analyzing the messages. The study is described in full in Salovaara et al 2006.

The response from the users was positive, which was mirrored also in the number of messages posted with mGroup: The four days totaled to 230 multimedia messages. The analysis of how mGroup was used pointed out how a joint use of phones can increase positive, engaging user experiences. Our interpretation is that collective use is the key factor underlying this phenomenon. Collective use of mobile media means that users create message chains or shared media collections participatively, and that the situations of media creation become events and shared experiences in their own right. The outcome, the media created, becomes a ”group property” in which individual efforts turn to common benefits. This can be contrasted to SMS/MMS communication that is essentially one-to-one and thus does not promote group cohesion and shared experiences very well. An important aspect of collectivity is collocated use– those situations in which many people participate in creating or viewing media in the same space, for example handing one phone back and forth to browse old pictures where friends have also been together.

In the following, we provide accounts of such occasions from the field trial with an aim to point out how development of ubiquitous technologies in interpersonal media applications can support collective use situations. We then discuss related findings in collective or joint use of media. Then the implications are turned into a new design -CoMedia -that serves our particular case of developing a new mobile group media system for event visitors.

2.1.1 Real-Time Cues on System Usage

In the field trials, one of mGroup’s main uses was coordination of activities between remote partners. Topics ranged from a discussion on what happened last night in a bar, and what will be done this evening, to notifications from people stuck in a traffic jam telling whether they can make their way to where the others are and join them at the same rally track. We noticed that in important issues, people made follow-up calls to know whether a message had been read at the other end. This implies a need for increased awareness of other users’ activities. Essentially, it is easy to collect information about users’ activity in the system and mediate it quickly to everyone. In addition to this, such information can be augmented with other sensor data that a phone may sense: for example, where people are (acquired with GSM cell ID positioning), where they are coming from, and whom they are with. It has been found out that such information may help people make clever inferences (see e.g. Jacucci et al 2006). This points to the opportunity for combining real-time information about both the system usage and other user activities.

2.1.2 Enriching Media with Context Information

Providing information about past activities in the system, such as contextual information from each message creation situation, can also be useful. In the field trial, we noticed that people found it very rewarding to browse through old messages with other people by talking, joking, pointing at pictures, and passing the phone from hand to hand. This is not only because people can re-live their shared experiences this way, but also because the messages can be re-interpreted and given completely new meanings. For instance, one late-night poor-quality camera phone picture of a pillow, accompanied with an unintentionally ambiguous text, brought up jokes among co-present viewers (see Fig. 1 – left and center). This episode of joking and passing the phone around lasted altogether three minutes and involved as much as six users.

To create opportunities for such situations, data about past message-creation situations should also be displayed. This provides resources for joking, expressing ideas, making remarks, and so on. In the longer term, contextual annotations also enable both the original creator as well as other members of the group to search for and organize media, as well as helping to remember the situation the media was created in.

2.1.3 Interaction with the Environment

One obvious situation to look for collective use is message creation. In the field trial, message creation – and especially its picture-taking part – was often a joint activity, and its importance was not only in the documentation of the activities, but also in finding new ways to be engaged in the surrounding event. For instance, we observed how a group found an adult magazine lying on the ground and made a rally-related joke out of it for their remote friends. The creation of the message was a lot of fun, taking 5 minutes and involving four persons in different authoring roles. Other collective creation activities were staging traditional group portraits and visualizing the group's inside jokes into pictures. In fact, these are situations in which the collocated interaction with friends, facilitated by the system, plays a more important role than the actual messaging with remote others.

Collective message creation moments often drew their inspiration from the surrounding environment, giving the spark for creating a message. This raises a design challenge to increase the interaction with the environment so that more opportunities for using the system would open up. The functionalities of the phone's camera and short-range communications are a few of the alternatives to consider: media can be attached to objects or spaces with Visual Codes, or shared to near-by devices with Bluetooth.

2.1.4 Short-Range Communication

Real-time awareness of others' activities as it has been advocated here requires fast connections. However, data traffic in very heterogeneous wireless environments poses obvious challenges. This was noticeable in the field trials, since the rally tracks were spread around countryside terrains where the signal is sometimes lost altogether. Another problem are the congestion's because of the high concentrations of mobile phones.

In these situations, the communication architectures should use also Bluetooth to circumvent some of the problems. For example, since people spend time together, they are in such proximity that messages can be synchronized locally with Bluetooth, while also attempting contacting the server at least from some of the phones. Users do not need to be aware of this. Hybrid infrastructures that combine features of client-server and peer-to-peer architectures are therefore useful in situations in which data transmission is inherently unreliable.

2.2 Related Work

Active spectatorship is an alternative approach to the perspective that spectators are passive witnesses merely enduring a sequence of events. Active spectators are driven by motivations and prior experiences to act out situations where the event itself is merely a platform for expression. Active spectatorship has parallels with the notion of *active users* (Carroll et al 1987) which highlights that users cannot be represented as information processing automata that merely generate responses to stimuli provided by an interface. The development of CoMedia has focused upon creating technologies that support and encourage active spectatorship; in particular, we have analyzed how mobile and ubiquitous media can support this type of behavior. 'Media' refers to all digital content distributed to mobile devices created by spectators or event organizers. The following describes three research areas of spectator experience, which we found can be supported by ubiquitous media.

Current mobile and ubiquitous computing has pointed to novel ways to support the sharing of media through mechanisms that allow binding them to the environment. For example, our group has developed a location based group messaging system where a "radar-like" interface shows how references of messages to the immediate spatial context of a user. Two field studies showed that such linking can enrich and spark new communication among strangers and friends. Elsewhere, we have proposed a mobile application to record and organise multimedia of visits using GPS paths and a multiple projections environment with tangible interfaces to navigate them. Our more recent research has turned to explore the roles of collectivity and collocated interaction. We learned that while MMS and mobile

phones are naturally supporting individuals and person-to-person communication, mobile media sharing spaces could better mediate group interactions of partially collocated and partially remote members. In this paper we extend this idea.

We believe that current mass applications fail to support two specific aspects of collectivity: the participative creation of media and its collective sense making. The former aspect points to how media can be the product of complex group interactions, whereas current applications assume that media is the product of individual authors or senders. The latter aspect points to opportunities to support shared experience of mobile media and foster its creation, for example by enriching it with awareness cues. These aspects have been poorly addressed also due to the distinction of work in two separate streams of research: the one commonly called presence (or awareness) applications on the one hand – and the mobile media sharing applications on the other.

Mixed reality applications create the opportunity of integrating these approaches: real-time awareness and interaction across digital and physical realms through multimedia on different platforms. This results in exploiting real-time processing of user activity, proximity of devices, short-range communication, and physical handles to digital media for the benefit of media-sharing activities.

2.2.1 Event Engagement

Large-scale events consist of multiple sub-events and take place over several days. Thus, a single spectator can only partially witness the whole event. For example rally spectators will painstakingly choose a small selection of stages and positions along the side of the course they will travel to. Spectators are also active in areas such as planning, documenting and betting, and will employ a wide variety of resources to do so, such as annotated pamphlets, radios and other spectator produced materials. Previous work addressing rally spectators (Nilsson 2004) noted that the primary interest of the spectator is to experience the event in action, socializing with other spectators. The design of *event information applications* focuses on the question of what type of timely information should be provided to the spectator (Nilsson 2004). Other work investigates new interfaces mainly from the point of view of the performer on stage (Reeves et al 2005) That is, spectators are traditionally seen as consumers of mobile media—only recently their role as creators of media has been considered (Jacucci et al 2006).

2.2.2 Awareness and Coordination

Statistics show that spectators organize themselves in groups when visiting an event. Typically a group engages in preparation activities *before* the event, but the revision of plans and the coordination of actions will continue throughout the event. Typically at some point a group will split into subgroups requiring a way for the subgroups to be aware of what the others are doing. There are many mobile awareness systems addressing presence and coordination. They provide both user-controlled and automatic (i.e. sensor-derived) *cues* of a user's situation. Through these cues they attempt to facilitate coordination and provide new opportunities for social interaction (Holmquist, et al 1999). Typically cues are related to the location, the proximity, or the activity of friends, but each mobile awareness system provides a unique set of cues (Tang 2001). Holmquist et al 1999 have tested an awareness device at a rock festival and in a conference and noted its usefulness for feeling connected with friends and finding opportunities to meet new people. However, there are no known reports of the integration of awareness cues into media-sharing applications.

2.2.3 Co-Experience in Spectator Groups

Spectatorship is intensively social. Spectators constantly look to each other to express and share experiences through a combination of verbal, performative, material, and technological means. Groups for example, display their identities with costumes and create group specific

idioms such as recurrent jokes that build up the collective history of the group. Spectators already engage in these activities using imaging technologies (mainly film and digital cameras). Previous studies addressed topics relating to the sharing of pictures in amateur photography (e.g. Kindberg 2005), and the conversational use of pictures in multimedia messaging (Koskinen 2002). There have been studies which analyzed how users mainly invite as viewers people that were present at the time of the shooting and the importance of commenting and knowing who viewed picture (Sarvas 2005). With the exception of our own work (Jacucci et al 2006), there have been no attempts to systematically support media sharing at large-scale events.

3 Year 1 Demonstrators

3.1 Overview

This demonstrator is divided into three component elements each of which is based on its own platform. These three elements are tightly integrated, forming an exhaustive user experience that supports the main aspects of spectatorship as outlined in Section 2: group coexperience, engagement with an event, navigation through space.

The three component elements described here are at various stages of development:

	CoMedia	Contact Wall	Illuminate
Features	Collective media stories, awareness cues, optical markers	Multiple point/person gestural interactions, contextualised display	Visualisation of network flows and social interactions
Platform	Mobile phone, S60 Symbian	Installation, public touch screen, rear projection, PC	Pervasive sensing networked nodes (mini-computers)
Development	Field evaluated prototype	Demonstrator	Simulation

1 Mobile Component : 'CoMedia'
From its inception CoMedia focuses upon the ever ubiquitous mobile phone. Interest in mobile phones stems from their 'always available' nature and their ever increasing capacity to run complex applications whilst providing ubiquitous internet access. CoMedia is a mobile phone application which allows its users to collaboratively create stories. Throughout the application there are tightly integrated Awareness Cues pertaining to other users current context – e.g. their current physical location – and activities – e.g. what story/message they are currently reading. Cues can also consist of physical markers placed on event posters, timetables or flyers; these cues are thus able to support spatial navigation or provide real-time and event specific information.

2 Installation Component : 'Contact Wall'
This component includes a large context-aware multi-touch-display; the large collaborative public display enables the collective and collocated interaction with spectator created media in addition to event planning and spatial navigation tools. The public display provides a new means for spectators to interact in large groups beyond the limitations of mobile devices, such as their small screen size, limited and isolational nature. The context-aware multi-touch-display is responsive both to the physical presence and digital profile of its users; it also reflects realtime event information and spectator movements and interactions (See Illuminate).

3 Pervasive Component : 'Illuminate'
This component explores strategies concerned with the mapping and visualisation of real world interactions between both people and space. People and spaces are illuminated with specific colours which are tied to specific events, places or spectator groups. Spectators are provided with illuminated badges the colour of which is determined by physical interactions with spaces, events and other spectators. This pervasive infrastructure allows for ambient cues regarding social interaction as well as the ability to map and visualise the flows and social interactions throughout the physical spaces of an event as well as digitally in other components of the showcase (e.g. See Contact Wall).

3.2 CoMedia – Distributed Engagement

Contextual cues such as a friends location or their current activity can be employed to enrich interactions on mobile devices; CoMedia specifically addresses the collaborative creation of stories at large scale events combined with contextual cues. CoMedia combines a collaborative publishing space for a group of spectators with tightly integrated reusable awareness elements throughout its design, it is built around three perspectives each with its own dedicated 'view':

1. Media Stories (creating stories together)

2. Member List (social presence of other members)

3. Event Pamphlet (plans and information of the event)

CoMedia allows users to create Media Stories that exploit technologies such as short range communications, proximity of other members in Bluetooth range, cell positioning and light weight augmented reality.

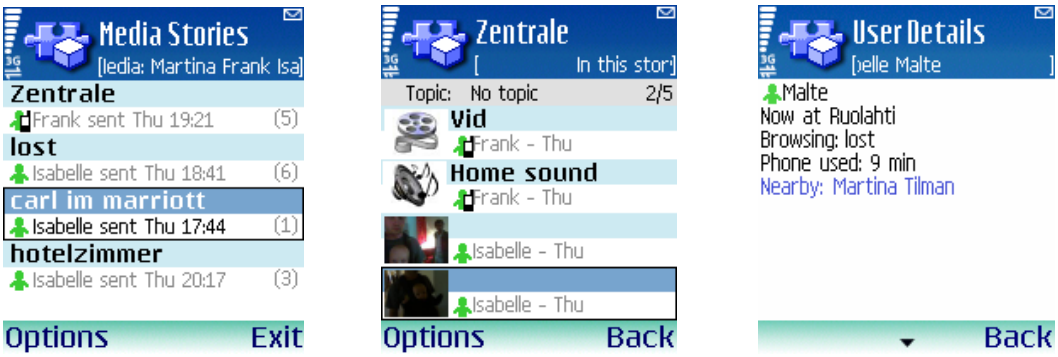

***Figure 2**: Three screenshots of CoMedia, left the list of Media stories, centre a list of messages in a Media story, right awareness information about a member.*

An interface has been implemented that allows Media Stories to be accessed using the camera and visual codes (2D barcodes) providing lightweight augmented reality. Hybrid messaging protocols have been implemented: while the first application was built following a clear client server architecture, the new messaging protocols in CoMedia integrate P2P features that allow short range messaging and synchronization between peers (clients).

Previous field trials suggested that the system should offer explicit support for communication that is related to some place. One way to achieve this is to attach media to a specific place or an object. All users who can access the place or the object have access to some common resources.

In this case we have taken an augmented-reality approach by using visual codes to fulfill this need. Visual codes are 2D bar-codes that can be detected with the camera of the mobile phone and produced with a printer.

***Figure 3**: The user is capturing a visual code.*

The pattern for using visual codes goes as follows: First the event organizers produce visual codes for interesting places and objects. The codes are printed out and attached to the objects before the event. During the event the users can attach codes to stories that they own. Once other users capture the code they are automatically invited to the story. An example of such activity taking place is in figure 3 where a user attaches a visual code to a story. It is also possible that users carry visual code stickers with them and they can attach the stickers to objects or places that are interesting. The visual codes can be used to share stories between people who might not even know each other, but have some common location-specific topic to discuss.

A critical evaluation of CoMedia delt with understanding the novel possibilities with regard to meaning making, action, and experience in various goal-pursuits that are typical to spectating.

Media captured and contextual cues about other spectators using CoMedia can be displayed upon the Contact Wall (See 3.3)

3.2.1 Specification

Hardware and OS	Linux based server Symbian/S60 2nd edition mobile phones. Currently the platform of choice is Nokia N70.
Software	Symbian C++ The Presence Scanner platform is used as the back-end to collect information Java Server software written with Java 2 Standard Edition (J2SE) Mobile client software written with Java 2 Micro Edition (J2ME) Visual code recognition done using open-source J2ME library by Rohs (Rohs 2005)
Core Features	Collective media stories: • The ability to capture and annotate media • The ability to share it with others • Presence/Awareness cues: • The ability to present information with regard to other peoples: • current location • current status (online/offline/nearby) • recent activity; what they have recently written/read within the application Optical markers can be used as 'bookmarks' that point to specific media stories.
Status	Field evaluated prototype.
Intended users	The intended users of CoMedia are spectators at large scale events who wish to capture and share their experiences with friends. In the field trials there were two groups consisting of 8 people covering a relatively diverse demographic.

Research Workpackages	The *mobile presence scanner* work supports CoMedia mobile client development by providing a component for gathering presence information using the native capabilities of S60 mobile phones (D5.1 deliverable for WP5, section 4.7).

3.2.2 Testing / Evaluation

Critical evaluation of CoMedia has centred on trying to understand how it furnishes novel possibilities with regard to meaning making, action, and experience in various goal-pursuits that are typical to spectating. To address this we introduced the prototype to two spectator groups participating at two different events: a rally in central Finland and a music festival in Cologne, Germany.

The field trials focused on finding out how people use the presence and awareness cues in combination with the media they capture. In the trials the presence- and awareness cues, combined with the shared media supported new ways to construct meaning, action and experience while participating in the event.

A conference article that was recently accepted into the CHI 2007 conference describes the field trials and their results in greater detail. Parts of the paper, titled “Mobile Group Media for Active Spectatorship”, are included as an appendix.

3.3 Contact Wall – Browse, Find & Plan

Spectators visit events as groups often developing image and identity with uniforms, recurring jokes, and names. Spectators constantly look to each other to express and share experiences through a combination of verbal, performative, material, and technological means. The camera phone has been found to be a valuable tool to share experiences when members are distributed but its capability to support collocated interaction is limited, thus a large public display is seen as a means to address this short-coming.

A multi-touch-display measuring approximately 2.2m x 1.25m will be installed in a centralised location, the display will allow several spectators at once to browse elements such as a media timeline containing spectator created media in addition to event planning and spatial navigation tools. The display will also display contextual information such as spectator movements (See Illuminate). Navigation of the content on the display is achieved through gestures and direct interaction with the elements on screen. These gestures and interactions combine the use of one or two hands, fore arms, different combinations of fingers and also interactions where there is no physical contact with the display. As an example using the palm of ones hand pushed against the screen and rubbing it over objects might act as 'board rubber' where using the edge of ones hand in the same way might gather objects into piles (like gathering sand into a pile on the beach). In addition the information displayed is contextualised for the user, or in combination with a group of users present at the display, for example showing an existing event schedule or reverting the display to its last state when a spectator approaches the display.

Through the use of physical interactions combined with the presence of people gathered around a display it is possible to facilitate, natural, compelling and interesting means of expression and interaction for the spectators that is not currently possible.

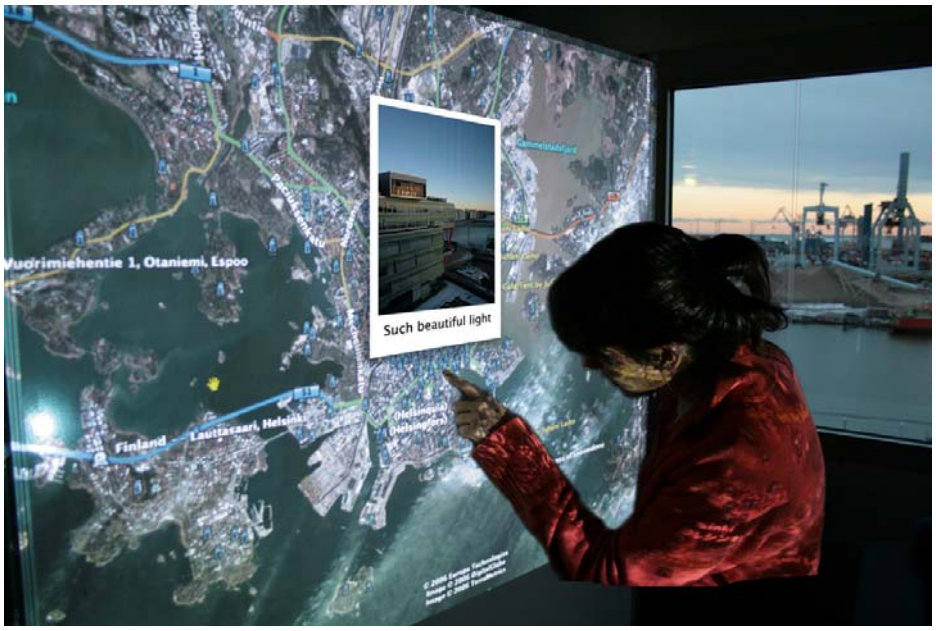

Figure 4. *A user browsing complex information about the event on a large touch screen.*

3.3.1 Scenario

Jim is wearing his ticket given to him by the event organisers, it contains an RFID tag. When Jim approaches the Contact Wall it reacts to his presence and welcomes him to the event by showing the name and logo/picture of the fan group he is part of with his friends and displaying some event information. Jim wishes to check the event timetable and quickly pulls up the event calendar, Jim looks through it and highlights a few events he is interested in attending. Once he is done he is asked if he would like a printout of the information, he accepts and receives a printout containing information regarding the events he wants to attend with travel instructions and other pertinent information.

Jim and his friends are now passing by the wall and Jim wants to show them the media he was looking at previously. He approaches the wall and it reacts by moving back to the state it was in when he left, together with others he pans back through the images and goes through them with the group. When they get to the image he commented upon Jim notices comments in response to his own. Together they read through them and follow up with another message that is created collaboratively. The wall then reminds Jim that an event is about to begin and Jim and his friends rush off.

Jill approaches the Contact Wall, it reacts to her phones presence (via Bluetooth Identification) it stops showing a generic slide show of images and returns to the previous state Jill was using. Jill is using a mobile media publisher with her friends and they are all curious to see the pictures and videos they have been taking. Jill brings up the media for their group and proceeds to flip through it every so often pausing to laugh and joke about certain videos and pictures. When they are done Jill and her friends walk away and the wall returns to its previous state.

3.3.2 Specification

Hardware and OS	• Data Projector • Infrared Camera • PC Hardware • Linux • RFID reader*

	• Printer* [*in future developments]
Software	The software is written with a modular approach, splitting code into generic off-the-shelf components and application-specific components. The main parts of the software are the touch-display manager and the application layer. To detect contacts against the multi-touch-display the system uses an infrared camera coupled to a computer. The computer runs touch-display manager software that 1) captures images from the camera and 2) calculates touch-points from the images using computer vision methods. The software for the first task will be platform-specific, while the second one will be platform-independent. The touch-display manager is generic software that can be used in any touch-display application. The first implementation of the software stack will run on the Linux platform and it can be ported to other platforms as needed.
Core Features	• Multiple point touch-screen supporting interaction with two hands and several people at once allowing for group interactions (The current demonstrator however is single touch; multi touch technology will be developed in a future version) • React to the presence of the users • Panning a map of an event area • Browsing and organizing of media on the map
Status	Technological demonstrator
Intended users	We foresee the ability to be an arbitrary number of users at one time, this figure is limited by the physical size of the screen and how many people can physically touch it at once. We anticipate the groups of users to range from passers by wanting to simply look at media, to people interested in engaging in the various areas of activity over several days which the wall provides for such as media captured at an event and commenting upon that media. Another user group we see are users of the Alloy project.

Features that will be implemented during the remaining of the project:

- 'Session' support:
  - via the use of RFID tags to identify specific users
  - via the use of Bluetooth devices to identify specific users
- Media Browsing via timeline/tag based interface
- Event Planning via timeline/calendar interface, with the ability to print out a hard copy of the plans
- Route Planning

The ability to provide dynamic representations of data and media gathered from the event via other projects/platforms etc. An example would be a representation of the event based upon Illuminate (see 3.4)

The application layer takes input from the touch-display manager and runs corresponding application logic. In this case the media display application needs to connect to the data sources that are required for the display tasks. This includes RFID scanner/printer, Bluetooth device discovery and web services that offer the relevant content that is to be displayed. The event planning system uses partially the same data sources, but uses a media planning database to provide the user-specific information.

3.4 Illuminate – Interaction Traces

The movement of people through distributed event spaces are the staging area for social interactions that occur outside a given users peer group. These network interactions are composed of flowing movements resulting in moments where new, perhaps fleeting, connections are made. The interactions and network flows are two important aspects of a spectator's activities which are both ephemeral and invisible aside from brief apparitions. In addition a constant flow of people through a given space may partially obscure a transportation network, rendering it invisible to the casual observer, i.e. a specific group of people become lost in the noise of street traffic. Rendering partially invisible flows and social interactions visible enriches a spectators presence at and awareness of an event.

As a means to visualise and support these flows and social interactions, people and spaces are illuminated with coloured lights. Physical spaces are illuminated with ambient lighting, whilst people are provided with illuminated badges. The colour of ones badge or the colour of a space is affected by physical interactions between spectators and spaces, events or other spectators. The range of possible colours are tied to events or various genres, e.g. red for folk music and blue for jazz at a music festival.

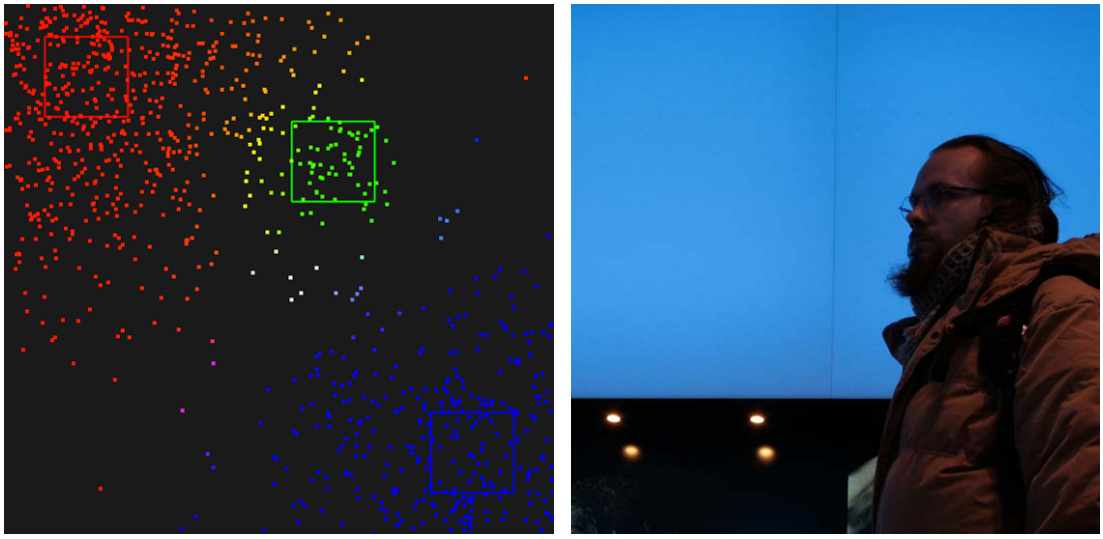

Figure 5. *Left a simulation of Illuminate in which mobile color nodes interacting with each other and with spaces (the sqaures). Right a suer being guided by colors along paths in event spaces..*

The illuminate project allows for people to both leave traces of their movements. In addition it also enables people to retain traces of both the people they interact with and the spaces they move through. It allows people to peripherally gain some insight into what 'type' of person someone else is, perhaps sparking unexpected conversations or interactions. The project also enables the mapping/visualisation of spectator flows through event spaces and social interactions over the course of an event.

The project is realised through the use of a network of nodes each equipped with RF sensors and an Internet connection, the nodes also have the ability to control ambient lighting within

the space they are installed. A wearable electronic badge, to be prototyped using mobile phones, will employ an RF sensor and a light source. Visualisation of the network flows is enabled through the Contact Wall (See 3.3). In addition the colour of a users badge can be used as a presence cue in the CoMedia project (See 3.2).

3.4.1 The Scenario

Person 1 and 2 both head to the red space. Once at the red space their badges begin to 'absorb' the red colour of the space turning their badges new colours. Person 2 heads off to meet Person 3, Person 1 continues to absorb the red colour of the space whereas over time Persons 2 and 3 absorb each others colours. If Person 1 remains in the red space long enough the badge will turn the same red as the space. Over long periods of time the colour of the space will also change, for example if a lot of blue people enter an area over the course of several days the space will absorb some of the blue colour.

The coefficient of the colour change is determined by how influential a badge or space is. For example a space might be more influential than another persons badge. Colour changes are imagined to take place over hours and days rather then seconds or minutes.

The system also allows for the flows and movements of people to be tracked which can be used to give representations of various spaces based upon the type of people who have moved through over the course of an event. It also allows for traces of events to be left behind in spaces after an event is over. A map of these movements is envisioned to be displayed on the Contact Wall (See 3.2).

The choice of the colours and the coefficient of the colour change is dictated by the specific event being deployed at.

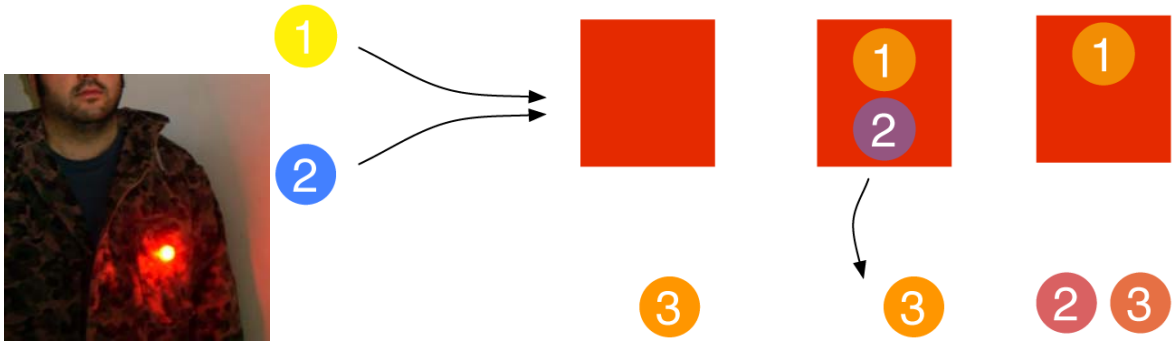

Figure 6. *Left Figure 2: A vision for the demonstrator visitors wearing a interactive color badge. Right a diagram of how the interaction of how badges and spaces can interact.*

3.4.2 Specification

Hardware and OS	• Linux-based PC • Linux based embedded devices * • PIC's with embedded Bluetooth chips *
Software	• PC-based simulation software for concept development • Software for the Linux-based embedded devices (C/C++)* • Software development for the PIC's * • Server software to store the data * [* in future versions]
Core Features	• Simulate the flow of people through spaces • Support interactive construction and testing of different spatial arrangements of spaces and people
Status	• Linux based simulator • Mobile phone based prototype
Intended users	System developers.
Research Workpackages	Oulu is doing development for Illuminate within WP5. Oulu provides software for the Linux-based embedded devices, PIC's with the embedded Bluetooth and the central server.

Features that will be implemented during the remaining of the project:

- Ability to track users through event spaces
- Ability to visualize and map social interactions and represent them in various ways such as on a map
- Ability to visualize paths and flows and represent them in various ways such as on a map
- Ability to indicate a users 'interests'
- Ability to work in an ad-hoc manner without the need for centralised servers
- Ability to change the colour/mood of a space to reflect its inhabitants
- Ability for users to gauge another users interests sparking new conversations and moments of interaction.

It is envisioned that there will be hundreds if not thousands of users in the final implementation. To begin-with however we anticipate users totalling in the low tens, perhaps 30 or 40, with that number then ramping up across iterations.

3.4.3 Technology Probes – Loca

The Loca project involves the deployment of a network of bluetooth nodes around urban spaces such as city centres. The network has the ability to potentially track anyone with a bluetooth device and send these messages. The content of these messages is informed by data that Loca network has gathered about that specific device, and secondly by urban semantics, (the social meanings of places that a device has been). Other aspects of the Loca project include maps that illustrate peoples habits as inferred by data collected by the Loca network.

The Loca system was made primarily as an artistic system to problematize the use of wireless tracking and identification technologies. The system also served as a technology probe that gave concrete knowledge of how to build a large-scale Bluetooth-tracking system. It was also useful in finding out how people react to such systems in real-life settings. This information is useful in e.g. the Illuminate demonstrator.

Hardware and OS	• Symbian Series 60 phones e.g. Nokia Ngages • Large power source • Concrete casing

Software	• UNIX type server
	  • PHP
	  • MySQL
	• ContextPhone

Core Features	The ability to: • Track bluetooth devices at intervals of 15 seconds. • Send bluetooth devices messages based upon complex semantics. • Disseminate the logged data and messages amongst all peers in the network. • Ability to scale the network up or down according to demand.
Test users	ISEA 2006 (San Jose, USA). The 'users' were simply passers by who happened to have bluetooth enabled on their mobile devices, for example as ISEA there were around 2000 'users' of Loca with more than 700,000 data points gathered in five days.

***Figure 7**: Installing LOCA nodes around the city.*

***Figure 8**: left the hardware composition of a Bluetooth scanning node. Right the Loca stand where people could receive print outs about their presence around the city.*

4 Dissemination

The work of this workpackage already resulted in two publications:

Jacucci, G., Oulasvirta, A., Ilmonen, T., SalovaaraA., Evans, J., “CoMedia: Mobile Group Media for Active Spectatorship” to appear in CHI2007, ACM press.

Jacucci, G., Salovaara, A., Oulasvirta, A., Ilmonen, Tommi, I., Evans, J. (2006). CoMedia: Integrating Context Cues into Mobile Group Media for Spectators. November 20-21, 2006. The 3rd International Conference on Enactive Interfaces, Montpellier (France).

5 Appendix: Field Evaluation of the CoMedia prototype

5.1 Data Collection

The following methods were used for data collection:

Background questionnaires pertaining to 1) using related communication technologies, and 2) the social relationships between users: how they knew each other and how often and in what circumstances they usually meet.

Content analysis. This includes the Media Stories created and messages sent through CoMedia.

Interaction logs for each phone. For instance, each viewing of a message was logged, as well as detailed data on how each feature was used.

Participant observation. Two observers in both trials shadowed the sub-groups observing natural behavior using video cameras. We took great pains to avoid instructing users on possible uses for CoMedia, suitable moments of use, places in which it could be used, or suggesting relating to how users might spend their time at the rally. To make shadowing and videotaping more efficient in the Rally trial, we had a third researcher following the group’s discussions in CoMedia through the Internet, and informing the observers by (silent) SMS whenever messages were sent. For the observers, this facilitated their decision making on where to point the video camera.

Concluding interviews were held individually with each user within one week of the trial. The interviews focused on three areas: 1) inference and use of cues, 2) use of media stories, 3) use of event information, and 4) feeling of presence and moods using the application. The interviews were primarily cued by content and the interface feature in question. We asked the interviewee to recount narratives of real, actual episodes that happened (as opposed to opinions and generalizations). Opinions and simple ratings were collected of the usability and usefulness of the system once the recounting of narratives was over. Finally, the users filled in a social presence questionnaire and explained their ratings. The typical length of an interview was one hour.

5.2 Overview of Interaction and Media Use

As an introduction and prelude to more qualitative insights into how CoMedia was used and appropriated, we present statistics extracted from the logs describing the use of both the various CoMedia features and the media that it generated. We analyzed the logs breaking down the various features of the system into the two trials.

Occurrence	Rally Trial (2.5 days, N=8)	Festival Trial (3 days, N=8)
CoMedia running per user per day	7.8 h	7.3 h
Stories created altogether	35 (14 empty)	47 (9 empty)
Average lifespan	68.2 min	115.3 min
Text elements in a Story	4.2 (SD 4.3)	2.7 (SD 3.3)
Images in a Story	1.0 (SD 1.5)	4.6 (SD 6.2)
Video clips in a Story	4.4 (SD 5.8)	1.1 (SD 1.7)
Audio clips in a Story	0	0.3 (SD 0.6)
Messages per Story (non empty)	4.7	5.5
Messages created per user	11.7	25.7
Messages viewed per day per user	13.6 (SD 7.9)	38.0 (SD 13.7)
Average number of users present when creating a message (Bluetooth)	3.3	2.4
Event Pamphlet access per day per user	4.5	2.9
Member List access per day per user	5.3	5.5

Table 5.1. Frequencies of various user actions with CoMedia. Based on interaction logs gathered in both trials.

There are five conclusions we can draw from the table and additional analyses we did for the logs:

1. *Active use.* CoMedia was used actively, covering about all the time a user spent at the event.
2. *Use of stories reflects the nature of the event.* The lifespan of Stories reflect the durations of the various sub-events in the event. (Also, the titles given for Stories were often the names of the sub-events.)
3. *Visual media important.* Visual media was actively used in both trials. Yet, the Rally group preferred video and the Festival group images.
4. *Using media together.* Messages were viewed and created when other users were present. Our video observations shows that a large part of these were collaborative uses where the phone was shown to a co-present other.
5. *Stories the main functionality.* While all users used the Stories actively, usage frequency for other features was less uniform. There were one or two users in both trials not using the Event Pamphlet or the Member list at all.

5.3 Appropriations of CoMedia

We present the findings of our evaluation through a description of the ways in which users appropriated CoMedia. *Appropriations* refers to recurrent uses originating from user activities, as can be inferred from the interviews, videotaped observations, and content and log analyses. The term appropriation was chosen because although we designed the system with general use scenarios in mind, we had no clear idea on how the use of the system would actually be embedded to the activities of users. We analyzed the data first extracting individual instances where CoMedia was used and then iteratively categorizing the appropriations. In this analysis, it was important to understand the intentions and roles of the participating agents, what was being done and particularly, how CoMedia's features were utilized.

5.3.1 Onsite Reporting

Members of the groups we studied were often separated for various reasons such as simultaneously following sub-events of interest or the need to stay home. In these situations, it was commonplace for onsite members to create *reports for the others*; through text, videos, pictures and sound. These reports attempted to convey some details of the event and what it was like to be there.

In the festival trial, several of the onsite reports were about *conveying the experience of a particular performance or venue*. For example, one user (Roman) sent a message with a sound clip and the text "The sound kicks ass but there is no place for dancing… ". When some members were not able to attend, which occurred during all three evenings of the festival, there were cases of *onsite reporting*.

Onsite reporting in the rally trial included explicit requests to others to evaluate different viewing spots, or to share opinions regarding how various drivers were able to drive through a certain curve or a jump in the road. To do this, messages were supplemented with videos and verbal remarks. In a Story called "Laukaa" (a name of a Special Stage), Linda sent a message with two video clips and a small teaser: "[A driver in the video] avoids that rock really skillfully! If only our guys could do something like that as well…that would be quite cool…" In interviews, Esa explained:

"We were interested in getting video and sound into it. In rally sports you can figure out if you have a car approaching, you know where it starts breaking if you hear the sound changing […] when you see the road and hear the sound, that's it. You hear the bounces in the road, what the place is like. We sent these messages to others, and they sent back similar stuff to tell what their place is like."

Evaluations of this kind with regard to viewing spots were typical when the group walked along the track and decided where to stop to watch the cars. Use of a common media space allowed also remote group members to participate in the evaluation.

In some cases, reports were created to *share an important moment or place*. At the music festival, Julia dedicated a Media Story to share her last day at a workplace. "My workplace. Adieu the last day…" She explained in the subsequent interviews:

"I found it nice to show my workplace to the CoMedia group; it was my last day at work, I could share it with everybody."

At the rally, some group members had been able to find tickets to a special VIP area to which other visitors were required to pay a lot of money (150€). Through the evening, they reported with messages about for example the free drinks that were served (Figure 5.1 left). Jenni (who was not there) explained that:

"When Linda and Ellu were there in the VIP party, we could also participate a bit though we weren't there. You could get into the atmosphere. I looked at that many times during the evening as new messages appeared."

Figure 5.1. Messages from the rally trial. Left, onsite reporting from in the VIP area free drinks. Right, a message from remote spectators.

To sum up, active spectatorship with CoMedia is evident in the way members create reports by selecting and framing particular aspects of the environment through pictures, videos and sounds combined with textual descriptions and reflections of experiences. These were done to share and document important moments and aspects of the event.

5.3.2 Keeping up to date with each others' undertakings

The spectators we studied were often apart for longer periods, which caused a natural interest in following what others are doing. They used a *combination* of the Media Story and Member List features to keep up to date with each other. In the festival trial, for example, Tilman recalls an episode from Saturday night when he did not see any new messages from Julia and Malte, and therefore employed the Member List to gain and understanding of what they were doing. Tilman explained this later on:

"Its always good when you can see when they last used the phone and to see who is with them… You know what the others are doing then maybe you go and join them. […] It was informative and interesting to see where and with whom the people where because it is an event that was organized simultaneously in different locations. Sometimes it was also important for the theme that was handled in the story to notice who took part in the experience."

An important feature for the festival group was the possibility to *name a location* with an own description that would then appear automatically when the user would be in that location. For example, the festival group entered descriptions for a location 72 different times with an average of 9 descriptions per user. Tilman told us:

"I found it good that because you enter a name, the locations have acquired other names. I find it good that within a group new descriptions for places emerge this makes our group feeling stronger."

In the rally group, keeping up to date also included episodes where members were concerned about each other. This was very clear during the day that followed Linda's and Ellu's VIP evening. Because the girls did not show up in the morning at the cottage, everyone shared a little worry about their well-being. This worry was eventually relieved upon seeing messages from a new Story called "VIP pier" (Figure right). In addition to seeing the messages, the locations of the girls delivered through the Member List showed that they had found their way back to the group's base. Toni explained:

"At least this message I will never forget, when Ellu posted this, what was it, yeah, the 'VIP pier'. There were Linda's hoorays in there. It was really interesting, they were not even spectating the rally but still they were really on! Staying at the cottage but still with 100% spirit."

The two groups differed in terms of this appropriation. The festival group reported the importance of being constantly up to date with each others activity. For the rally group, this was important only in certain topical moments. Both groups used the Media Story and Member List features in concert in this appropriation. This appropriation, with regard to active spectatorship is different, because the checking of others undertakings was more of a background activity; however this activity often sparked and inspired other actions.

5.3.3 Remote spectating

It happens often at large-scale events that some members *cannot* participate in a sub-event they find of interest. CoMedia was used in such situations in two ways: 1) by off-site members to be *part* of that happening; 2) by on-site members wanting to know how the competition or the event is advancing in remote places.

In the festival, Martina had to stay home with her baby while the rest of the group went to follow performances. She explains how CoMedia supported her:

"I was not much with the others and when the others were away, I felt a bit as if I would be there with them although I was not there physically… I was interested to know what the others are doing how the venues look like, how the music is. The sounds were very important in the festival because I could hear if I like the music or not."

This appropriation was often achieved by prompting others through a message in a Story to explain what it is like to "be there on-site". Replies to these messages were also used to portray to the off-site member's own situation, for example, when Martina sent a picture with a sad face and the text "I have to stay home. Have fun!" Every night the off-site members sent in messages, even very late in the night, to the rest of the group. Very similar episodes were encountered also in the rally trial.

To follow unfolding sub-events of interest the on-site members used the Event Pamphlet. Two sub-sections of Event Pamphlet were utilized: "Standings" and "Backstage." Standings were particularly useful to monitor the success of specific drivers and to follow-up on specific events they had witnessed. One participant told:

"When Latvala [a competitor] had a fire burn, I was watching how much he's behind, if he's made it to the end of the stage. […] I was also following if Marcus [a Finnish driver] was still leading and how much."

The Backstage section was reporting drivers' comments from parc fermé and news that is more general about rally. Some users were using it mainly to find out why a driver had underperformed. When something interesting was spotted, it was often shared to collocated members:

"I was reading this to Toni in the car, about Välimäki's [a driver] neck being swollen. We don't like Välimäki so this was the funniest Story when he was complaining about his neck and back hurting. I read [it aloud] and we all laughed."

This appropriation was relevant in both trials and spanned all three features. It is related to active spectatorship in two ways: 1) remote spectators portray themselves to be part of the group even if they are not there, 2) off-sites members construct socially an awareness of the remote event by commenting aloud, discussing with collocated members.

5.3.4 Coordinating and making plans

When group members were distributed, they often had to revise plans in response to unfolding events; this required careful coordination of joint activities. All three views of CoMedia were employed in this activity. The Pamphlet was used to revise plans with up-to-date information on the following events or to enter items in the group schedule. The Member List was useful for keeping awareness on the location and activities of others. Media stories were used explicitly to post coordinating messages such as invitations, questions, and negotiations.

For example, Julia (on Friday at 21:14) asks who is interested in going to a certain performance. After 4 minutes Frank replies that he will be going there. In another message sequence Julia starts with "good morning" and then complains about headache. Tilman after less then three minutes invites to lunch the group with the message "at 14 :00 spaghetti at our place". Malte then asks if everybody is invited and notifies that he is coming. After the lunch, Roman notifies the group about the plans with his girlfriend: "After the big Bolognese party we are going to the Chocolate Museum and we buy Vodka on the way home". After 10 minutes Frank notifies with a message that he has entered two items in the group schedule. These had been discussed in the group the day before.

Figure 5.2. Messages from the music festival. Left, a video collage using the sound track sent in another message, Roman pretends to be the baby crying. Right, a

In the rally trial, having the rally schedule on the mobile phone proved to be useful for planning of daily schedules in the rally. The group was divided in two or three sub-groups most of the time (except at night), and had to adapt to the traffic jams and difficulties in way-finding, because they preferred viewing

Activity	Media Stories	Member List	Event Pamphlet
Onsite reporting	Creating media of on-going situations		
Keeping up to date	Reading about latest activities	Knowing where others are	
Remote spectating	Spectating through others' messages	Knowing the spectating spot	Doing follow-ups
Reliving	Reviewing past Stories		
Coordinating	Negotiating plans, reporting progress	Following others' progress	Scheduling and suggesting visits
Joking	Staging funny situations for media		

Table 5.2. Utilization of CoMedia's features in spectator activities. Aggregated over the two field trials.

spots where few other spectators were present. The usefulness of the schedule was expressed by Esa:

"When results started to appear in the system, then at some point we used that to decide where to go next. We did not use it only during Friday but also on Saturday. We did not have a map, it would have been in the backpack, but it was easier to do that by using the phone".

In both trials there are also cases in which the Media Stories were employed for *storing and sharing detailed group-relevant information*. In the rally, two users, Toni and Jukka, were betting about the winning driver in some rally stages. Their betting information was printed on a little paper ticket, but they put the relevant parts into a separate rally betting Story, to make it accessible to everyone.

This appropriation was relevant in both trials in the same way. Both used all views of CoMedia with the only difference that in the rally the Event Pamphlet was used more to be aware of upcoming events.

5.3.5 Reliving and knowing what others have done

Not only current and near-future events were important but also spectators often spent times remembering, joking, and discussing past happenings. This included reviewing Media Stories from several hours to days later on the phone or from Webstories. This was done either by the creators of messages and members who reminisced and relived previous events, or by other members that could not be there to know what others had done.

The log data conveys that users quite often read the messages they created themselves (18 and 16% of all viewings in the Rally and Festival trials). Of these viewings by the poster, a vast majority (78 and 56%) took place almost immediately (within one hour) after posting it – most probably for the reasons of checking how the message looks and if there are new activities. However, a small but significant part of these viewings took place long time after the activity in the story had died. Particularly, in the Rally and Festival trials, 11 and 20% of viewings of a message by the author occurred six hours after the message was created. Our interpretation is that these were mainly done for the purpose of remembrance and reliving the situations.

The festival group reported on the importance of reviewing messages the 'next day'. Tilman for example explained that he read messages the next day to relive and remember the previous evening. Nike on the other hand reported viewing messages to see what others had done once she left to go home and to know when they made it home.

In the rally, for example, certain pictures in a particular story had been viewed multiple times. Tiina told us:

"Then there was this pier story, with Jani, we looked at that many times! We thought that oh no, should we start to drive there, are they okay… That was really good!"

This appropriation also applied to the Webstories. To give an example, following the end of the trial the festival group accessed the Webstories site a total of 293 times over 10 days with one user accounting for 144 accesses. Five other users viewed on average a total of 33.75 stories each. The uneven distribution of viewings is due to the fact that four users live next to each other and reported carrying out most of the viewings together.

This appropriation is an important aspect especially for events that last several days [Salovaara et al 2006] and it was relevant in both trials. Spectators are active in reflecting and joking about past happenings using the Media Stories as a resource. Media Stories provide documentation of situations enriched with dialogues and contextual information that spark discussions and jokes and contribute to prolong the event experience.

5.3.6 Joking

A spectator's day is characterized by different periodic activities with different rhythms. In what can be called downtime use (e.g. when waiting for a stage to begin), we observed the spectators actively looking for ways to avoid boredom. Spectators were active inventing ways to have fun. Media stories provided a good tool for staging and communicating jokes in a distributed group.

In the festival group, Tilman sent a video of a baby crying. After a while Isabelle took a video of Roman pretending to be a baby and using Tilman's video's soundtrack (Figure 5.2 left). One story was created as an open game to the group. The Story was called "guess the movie". Roman posted a sound clip of a Movie and Malte guessed what the movie was.

At the rally, the users at the VIP area (Ellu and Linda) sent a video about the toilet facilities. It was supplemented with a name of a portable toilet that is common at events. This text oriented the viewers to expect something completely different than a clean, spacious toilet that actually was seen in the video. In Ellu's words:

"[…] now you could directly send something as you got the idea and you were there at the toilet. And at the same time, I could share it with many people. You know, usually Bajamaja is just a one-person cabin. Now it said 'Bajamaja' with big letters, and then there were six normal toilets, with mirrors and washbowls and all. Now there was the idea! A Bajamaja in VIP style versus a normal Bajamaja."

Joking is an important social aspect of spectating that creates group memories referred to in the group's interactions. CoMedia provided in both trials an additional tool to create jokes and more importantly to share and document them with multimedia.

5.4 Conclusions

CoMedia is a novel application integrating three previously unrelated types of information and functions for spectators: event information, media sharing, and awareness. It was inspired by the idea that spectators are not only passively watching events, but go there for "extradaily", heightened moments. These, we argued on the basis of research into spectatorship, can be supported with multiple features tapping into their engagement and co-experience of an event, as well as awareness and coordination with others.

Across the two field trials, we witnessed that CoMedia can support *active spectatorship* more widely than we have previously been able to achieve. Despite the differences in the user groups and event settings in the two trials, we found the appropriations to be surprisingly similar. The main differences were that the rally users made more use of the Event Pamphlet and the festival users used more the Media Stories. We learned that the appropriations common to both trials contributed to supporting the collective character of activities, as well as development of group belonging and togetherness. CoMedia enabled media of on-site members to be used as a proxy for spectating remotely. In the end, activities inside vs. outside the system were not easily separable in activities like coordinating, joking, and following the event "in the flesh".

Our paper has investigated the integration of previously distinct mobile applications. It has presented consequent design challenges and solutions in the setting of large-scale events. In this setting the integration was useful in supporting continuity of action as users are quickly changing their interests as a response to and in preparation for unfolding occurrences. Previous work has addressed only part of the features that are present in CoMedia. For example, they address only awareness at events and for visitors with no previous relation (Holmquist et al. 1999), they have implement mobile instant picture sharing for buddy lists (Counts and Fellheimer 2004), or provided a mobile client to share collections of pictures *after* events (Sarvas et al 2005). CoMedia addresses functionality across these application areas, but also more effectively supports collectivity as distributed members of a group can create and own media *together* and coordinate common action.

As Table 5.1 summarizes, each component of CoMedia was used in both trials. Media Stories were central in each appropriation and can therefore be considered the main function of the application. The Member List can be considered as a supporting feature and users

reported using it in more as a supplement and augmentation with Media Stories than as a standalone feature. The Event Pamphlet can be also a considered a secondary feature but was used more in isolation, almost as a separate application. However, we found that despite the isolation, it increased the users' interest toward the system and the possibility of using the other features as well.

The integration of awareness elements (the Member Icons) in both the Media Story and Member List was successful; these two features were also heavily used in combination with each other. Nevertheless, there are more opportunities for integration that can improve the usage of CoMedia: 1) the Event Pamphlet had a limited integration with the rest (only with Webstories is event information inserted into the narrative of a story), and several users lamented the poor integration of these contents. 2) The current integration considers only re-using common elements in different features (Member Icon), or reporting information about another feature (in Member List details the current story being browsed by that member is reported). There are possibilities to create more active *links* among features; for example providing a link to Media Stories either from the event item in the pamphlet or from the Member List.

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