

# Not in Karlsplatz anymore: Navigating Cities Together

Derek Reilly  
EDGE Lab  
Faculty of Computer Science  
Dalhousie University, Canada  
1-902-229-1612  
reilly@cs.dal.ca

## ABSTRACT

Support for asynchronous navigation of city spaces via location-specific annotation is a promising research area, but does not cover all ways that people can help each other navigate. This position paper discusses the motivation for and design of three studies being conducted concurrently at our lab, each exploring ways that technology can support synchronous navigation by groups of people in urban environments.

## Categories and Subject Descriptors

H5.3. [Information interfaces and presentation (e.g., HCI)]: Group and Organization Interfaces – *collaborative computing, evaluation/methodology*.

## General Terms

Design, Experimentation, Human Factors.

## Keywords

Group navigation.

## 1. INTRODUCTION

When navigating city streets, we bring with us a deep awareness of being in a social space. As we engage with the city environment we rely on cues, context, and communication provided by others directly and indirectly. Social convention gives us license to approach strangers for directions, and a stranger might approach us if we appear lost while looking at a map. We readily share our city knowledge and navigational expertise.

Maps themselves are a communicative medium, combining in their design knowledge of human cognition, formal models of sign communication (semiotics), and an understanding of how maps are interpreted ‘lexically’ by individuals [3]. It is important to realize, however, that reading maps in public is often done collaboratively. Collaborative use of maps adds an additional social dimension that must be appreciated if we are to develop systems that support navigation in urban spaces.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.  
*Conference '04*, Month 1–2, 2004, City, State, Country.  
Copyright 2004 ACM 1-58113-000-0/00/0004...\$5.00.

At the EDGE lab, we are exploring ways in which technology can support groups of people when navigating foreign and familiar urban spaces using maps and other aids.

## 2. GROUP NAVIGATION

Our efforts have been inspired by personal experiences touring Vienna while attending a recent conference. One evening while traveling in a large group we needed to find the location of a party. Even with two maps and a one-time Vienna native, locating the party did not give us enough information to determine the best way to get there (by foot, by cab, city bus, etc). Only after many turns looking at the maps, miscommunication, and much debate, we decided to take taxis. After another party, a group of people decided to go to a nightclub. There were too many people to take a single cab, so we decided to meet at a common meeting place before heading to a nightclub. That meeting place was Karlsplatz. Unfortunately, Karlsplatz encompasses several city blocks in Vienna – after much effort only two of five groups actually met up with each other at our agreed meeting point.

Our experiences led us to consider how technology could support synchronous navigation by groups of people. Such technology might increase the quality of communication by promoting awareness of one another’s actions and intentions, or by providing shared visual aids. It might reduce the chances of navigation error by making information available when needed, or by supporting group problem solving approaches. We are exploring three simple prototypes (see Table 1), each designed to explore the subtle ways in which technology can impact group navigation.

*Marked up Maps* looks at how an RFID-tagged paper map can be used with handhelds to support co-located group navigation.

*Coordinated Views* looks at how sharing common views with handheld computers assists groups when navigating together. This project also examines how a synchronized view with a remote guide might be useful.

*Rendezvousing* is concerned with how awareness of one another’s location may facilitate meeting in public spaces.

Table 1. Prototypes/studies and their focuses

Study	Artifacts	Remote / Co-located	Annotation	Shared View
<i>Marked up Maps</i>	Yes	Co-located	No	Paper map
<i>Coordinated Views</i>	No	Both	Yes	Optional
<i>Rendezvous</i>	No	Remote	No	Yes

Our initial approach is best described as a summer navigation blitz. Lab researchers will test interfaces by conducting navigation activities themselves in either complete studies or extended pilots. Using ourselves as participants is possible because we navigate, and practical because setting up experiments for evaluation in context can be expensive and time consuming. After these initial field trials, our prototypes, methodologies, and the questions we wish to focus on will be refined. Field trials with recruited participants can then begin. Because we are not directly comparing each technological support, the three studies are allowed to evolve as appropriate for their specific line of inquiry. This will allow us to explore a range of methodologies for conducting context-based research of this kind, and employ different activities (sightseeing, rendezvousing in a mall, scavenger hunts and other navigational games). This keeps each study fun, fresh, and interesting.

## 2.1 Coordinated Views

Sharing a single handheld device means individuals must gather together around a small screen. Screen size and viewing angle aside, this is difficult when sitting across from each other in a crowded subway. Following from research on shared views for remote collaboration [see 2, for example], we are looking at co-located sharing with small displays in dynamic environments.

In the first phase of this study, we will explore the use of a shared view for navigation during two organized city scavenger hunts. We will examine the case when views are synchronized (identical), coordinated (giving each participant control over awareness of each other's interactions), or independent. Maps can be annotated, and the annotations shared. Pairs of researchers are teamed up and assigned different conditions to use during the scavenger hunt. Each team has a remote support person they can communicate with via phone and their devices if the condition permits it. In addition to audio and input capture, an observer will shadow each team, taking field notes, video and photos.

## 2.2 Marked up Maps

In prior work, a survey of attitudes toward paper and electronic maps gave interesting if predictable results. Paper maps were preferred for their easy portability, and for displaying a wide area in a way that is easy to study and manipulate (by rotating, folding). Electronic maps were preferred for their greater coverage and control over level of detail (via overlays, zoom and pan), and textual search. Many said they used paper maps when mobile, and electronic maps for planning.

Following from work in tangible interfaces and mixed reality [4, for example], marked up maps attempt to provide some advantages of both paper and electronic formats. In our "mixed media" prototype, map locations are identified using small, flat RFID tags affixed to the back of the map. An RFID tag reader is attached to the back of a PDA, such that locations are queried by holding the PDA display-side up in front of a map region.

When navigating in groups, a marked-up map can serve as an overarching context from which group members can pose questions and into which they can relate their findings. In an exploratory field study, groups of three or four will conduct sightseeing activities in three separate sessions. For each session they will use a different set of tools (purely electronic, purely

paper, and the marked up map configuration). Feedback will be gathered from semi-structured diaries and group interviews.

## 2.3 Rendezvousing

This study focuses on the specific activity of meeting at a previously or dynamically specified location. Awareness of group member locations can permit more enhanced rendezvousing (find a suitable location for everyone dynamically, or determine where someone is). Cell phone communication doesn't give this contextual information unless everyone knows an area well.

The first experiment is situated in a shopping centre, without suitable location technology to permit a live evaluation of rendezvousing. A wizard of oz technique will be used to create the impression of updated awareness of location. Participants' screens are remote-controlled by facilitators who keep in contact with each other. To the participants, it appears as though their locations are being automatically updated.

Individual scenarios are derived from earlier work by Colbert [1] on the nature of group rendezvous activity.

## 3. WHERE TO GO FROM HERE?

As much as we might imagine them to be, urban areas are not extensions of our home or office - they are fundamentally shared spaces. Because so much of our time in urban spaces is spent with others, technology needs to support social interaction, not detract from it, if it is to be useful in this realm. In our exploration of navigation-related group activities, we will continue to build knowledge about user acceptance, patterns of use, and effectiveness of a range of technologies supporting group interaction in urban spaces.

## 4. BIO

Derek Reilly is a PhD candidate in Computer Science and a member of the EDGE Lab, Dalhousie University, Nova Scotia Canada. His areas of interest are broadly Information Visualization and Ubiquitous Computing. Most of his research has involved geographic maps, including how display attributes impact collaboration in map orientation tasks, and an interactive visualization technique called Map Morphing. In a prior life he has developed city guide prototypes, software for the mobile workforce, and innovated in patterns-based participatory design at U S WEST's Global Village Labs.

## 5. REFERENCES

- [1] Colbert, M. A Diary Study of Rendezvousing: Implications for Position-Aware Communications for Mobile Groups. In *Proceedings of INTERACT '01*, Springer-Verlag, (2001).
- [2] Kraut, R.E., Gergle, D., Fussell, S.R. The Use of Visual Information in Shared Visual Spaces: Informing the Development of Virtual Co-Presence. In *Proceedings of CSCW '02*, (2002).
- [3] MacEachren, A.M. *How Maps Work: Representation, Visualization, and Design*. The Guilford Press, New York, 1995.
- [4] Ullmer, B. and Ishii, H. The metaDESK: Models and Prototypes for Tangible User Interfaces. In *Proceedings of UIST '97*, (1997), 223-232.