

# Connecting Remote Teams – Cross-Media Integration to Support Remote Informal Encounters

Thorsten Prante, Richard Stenzel,  
Carsten Röcker, Norbert Streitz,  
Carsten Magerkurth  
Fraunhofer IPSI

AMBIENTE – Workspaces of the Future  
Dolivostr. 15, D-64293 Darmstadt, Germany  
{prante, stenzel, roecker, streitz,  
magerkurth}@ipsi.fraunhofer.de

## ABSTRACT

This video presents the Hello.Wall artefact in a mixed-media set-up to support spontaneous, informal encounters in two remote lounge spaces of a distributed team. The Hello.Walls are used as awareness tools to know more about the remote team's state and at the same time as a tool to smoothen transitions to place-based video communication among the remote teams' members. This connecting-remote-teams scenario was tested in a living-lab evaluation for several weeks and proved to foster remote informal encounters and thereby contributed to smooth and fluent project work in our Ambient-Agoras project.

## Keywords

Ambient display, informative art, social architecture, awareness, cross-media integration, place-based video conferencing, distributed teams, interaction zones

## INTRODUCTION

The Hello.Wall [2] is an ambient display [3] that emits information via light patterns and is considered informative art. It is used as a medium and mediator for conveying social awareness and atmospheric aspects within organizations or at specific places in order to support informal communication.

### Informative Art and Privacy-Enhancing Technology

The Hello.Wall unobtrusively serves an informative role only to the initiated members of an organization or a place. Others might see it as an atmospheric decorative element and enjoy its aesthetic quality. Therefore, we consider our work to be at the crossroads of privacy-enhancing technology and informative art.

### Zones of Interaction

To structure the interactions of people with Hello.Wall-enriched environments we have earlier introduced three

Daniel van Alphen

Hufelandstr. 32, D-10407 Berlin, Germany  
dva@vanalphen.de

Daniela Plewe

Franz-Künstler-Str 2, D-10969 Berlin, Germany  
mail@daniela-plewe.de

zones of interaction: The distance of an individual from the wall-setting defines the interactions offered and the kind of information shown (see figure 1).

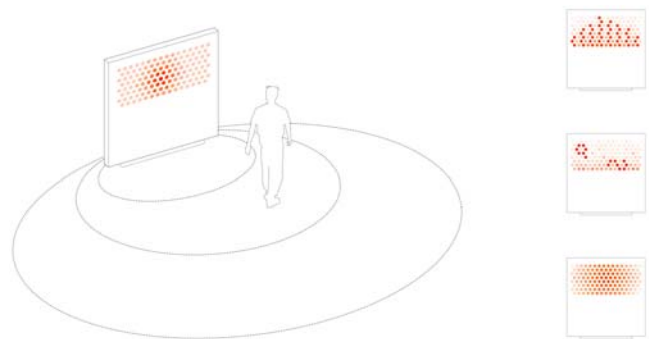


Figure 1. Three zones of interaction (left) and examples of corresponding light patterns (right)

People in the *ambient zone* contribute to and experience the so-called ambient patterns continuously displayed on the Hello.Wall. People in the *notification zone* agree to have the Hello.Wall-enriched environment react to their personal presence. This may result in notification patterns shown on the Hello.Wall. People in the *interaction zone* directly get involved with a Hello.Wall-centered environment. The wall reflects this by showing special interaction patterns.

## SCENARIO AND DESIGN ISSUES

The so called *connecting-remote-teams scenario* is presented in detail in the video figure accompanying this paper. In the following, we elaborate on several design issues related to the scenario set-up.

### Cross-Media Integration

We present the Hello.Wall along with View.Ports, physical button interfaces, and video trolleys to support spontaneous, informal encounters in two remote lounge spaces. This draws upon the observation that people in lounge spaces while, e.g., having their coffee break are tentatively available to others for a chat. By means of the mixed-media set-up, we support people on both sides in approaching each other by successive signals of agreement before actually engaging in a conversation. This is in

analogy to preparing the ground for informal (intended, opportunistic, or spontaneous) face-to-face communication.

### Ambient Display vs. Video Link

The symmetric Hello.Wall set-up hides disturbing and disrupting information compared to an always open video-link [1]. As an example, consider seeing somebody on the other side via a continuous video-link. People then often feel forced to react in some way (habits, internalized social protocols, etc.). In addition, the level of detail a video stream provides is not always appropriate. Instead, our Hello.Walls continuously presents an intuitively perceivable picture about the remote team's state in an ambient way to communicate atmospheric aspects and social awareness.

### Mapping of Interaction Zones

The three zones of interaction introduced earlier were mapped to the floor plans of the two remote teams' offices (see figure 2).

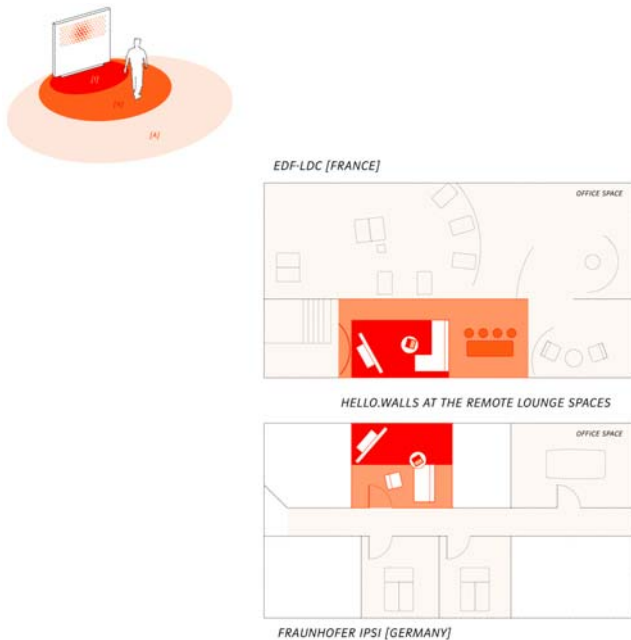


Figure 2. Three zones of interaction adapted to the floor plans of the two sites of the distributed team

People in the *ambient zone* as well as people providing their moods contribute to the ambient patterns displayed at the remote site. People in the *notification zone* notify their personal presence in the lounge space to the other side and thereby provide encounter cues. People in the *interaction zone* directly get involved with the system's communication facilities showing the remote site's team members their interest in engaging in a direct communication. They can do so by either directly requesting for video communication (VC) via pressing a physical VC request button or by employing the ViewPort which can show a video-only stream from the remote lounge space.

Both results in attention-catching patterns to be shown on the remote lounge space's Hello.Wall. The purpose of

employing a ViewPort-based and thereby rather private video stream is to see if somebody in the remote lounge space is available for video communication or engaged in another activity.

### Light Patterns

The light-pattern design realizes an ambient, and rather abstract information display with an aesthetically pleasing and non-monotonic appearance at the crossroads of privacy-enhancing technology and informative art.

*Ambient Patterns.* The Hello.Wall continuously displays the dynamic ambient patterns interwoven with each other while representing moods and the average general presence of the remote team members. The amount of light in the waving pattern represents the remote moods/atmosphere and the amount of light tails ascending reflects the general presence level at the remote team's site (see upper right of figure 1 for an example).

*Notification Pattern.* As an overlay to the ambient patterns, the static notification pattern is displayed consisting of none or more (here up to five) personal signs. To ensure good recognizability to 'knowing' users, these signs are displayed at fixed positions on the wall.

*Interaction Patterns.* Finally, the dynamic and attention-catching interaction patterns reflect direct communication requests or other direct explicit interaction with the system. If someone directly requests a video communication with a remote team member, concentric explosions appear on the remote Hello.Wall and implosions provide local feedback. The same local feedback is provided when moods are entered. Employing the ViewPort-based video stream results in a horizontally circulating light stroke that repeatedly crosses the remote Hello.Wall.

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### REFERENCES

1. Jancke, G. et al. Linking public spaces: technical and social issues. *Proc. of CHI'01*, 530-537.
2. Prante, T. et al. Hello.Wall – Beyond ambient displays. *Video and adjunct Proc. of UbiComp '03*, 277-278.
3. Wisneski, C. et al. Ambient displays: Turning architectural space into an interface between people and digital information. *Proc. of CoBuild '98*, 22-32.