

# A flexible gaze awareness support for group videoconferencing

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# Why bother with group-oriented videoconferencing?

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So, what is done to support these groups?

Currently, the standard solution is...

Treat the group as a “bigger” individual – one camera, one screen.

**We think it can be done much better!**

# Standard environment – an example



# Common problems

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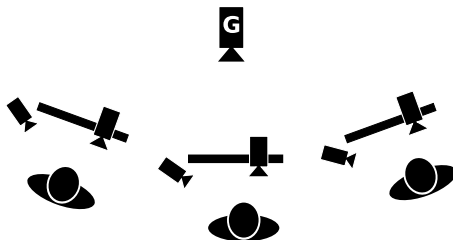
# Common problems

The standard environment experiences several major usability problems:

- **lack of gaze awareness**
- **presence disparity**
- **cost/inflexibility**



# Basic design structure

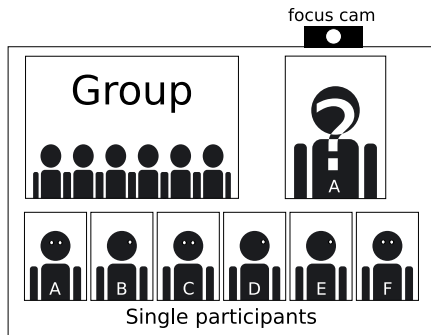


- each user has:
  - his/her own visualization screen (notebook)
  - two personal web-cameras
- the whole group is captured by one camera

# Visualisation screen design & functionality

## Main parts of the proposed environment:

- group window
- focus camera
- focus window
- single participants windows



# Gaze awareness support

## Our gaze awareness support is based on the following ideas:

- each user can select any participant to **focus** on (independently on the others)
- each user knows who has focused him/her:
  - if he/she is focused by a user, he/she receives the **focus camera** stream from that user
  - otherwise, the stream from the **side camera** is shown
- eye-contact can be transmitted:
  - if you focus on another user and look at him/her in the focus window, your image at her/his screen appears to be looking straight into his/her eyes
  - this is possible due to the sufficiently small difference between the camera and visualized image of the remote user

# Real world prototype – GColl



# Technical background

## Network layer environment:

- we chose an application-level distribution unit called **reflector** to mimic multicast connectivity

## Client tools layer:

- *Robust Audio Tool (RAT)* – audio
- *Videoconferencing Tool (VIC)* – video
- both these tools had to be modified in the creation of GColl

# Preliminary User Study

## In our user study:

- 18 participants took part
- they solved an investment game over the environment
- each meeting was concluded with a
  - semi structured interview
  - two questionnaires

# Results

## Results were quite optimistic:

- presence disparity
  - was not indicated by any of the users
  - nor by the results of a questionnaire
- the focus window
  - was used constantly and easily by the participants
  - fulfilled the function of mediating eye-contact
- interface usability

# Future Work

## Currently we are:

- preparing a larger study (approx. 180 participants) to evaluate our concept
- testing another extension to the current design which increases the volume of the audio stream from the focused user

## Our longer term plans include:

- extending GColl to support  $n$ -way cooperation
- eye-tracking as the means of focusing on another user



# Conclusions

**Our research is focused on finding suitable videoconferencing environments for communication of remote groups.**

Up to now we have:

- proposed and implemented a group-to-group videoconferencing environment – **GColl**
- conducted a preliminary user study evaluating our design

# Acknowledgements

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**Thank you for your attention!**