

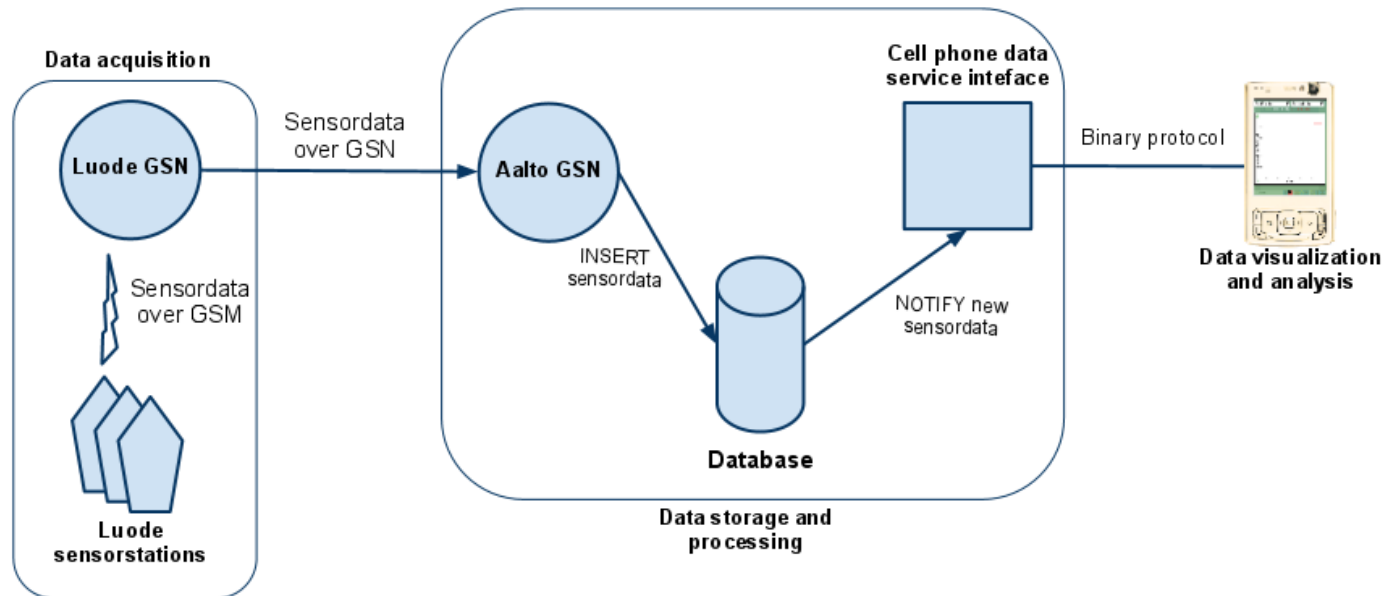
# Mixed Reality Annotation Streams

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# Introduction

- Present some of the results from EU project Hydrosys
- On-site monitoring and management of environmental process and events using handheld display devices
- Annotations are used to visualize environmental data in it's actual context

# Hydrosys data pipeline



# Mobile 3D visualization



*Kylmaoja testbed near Helsinki*

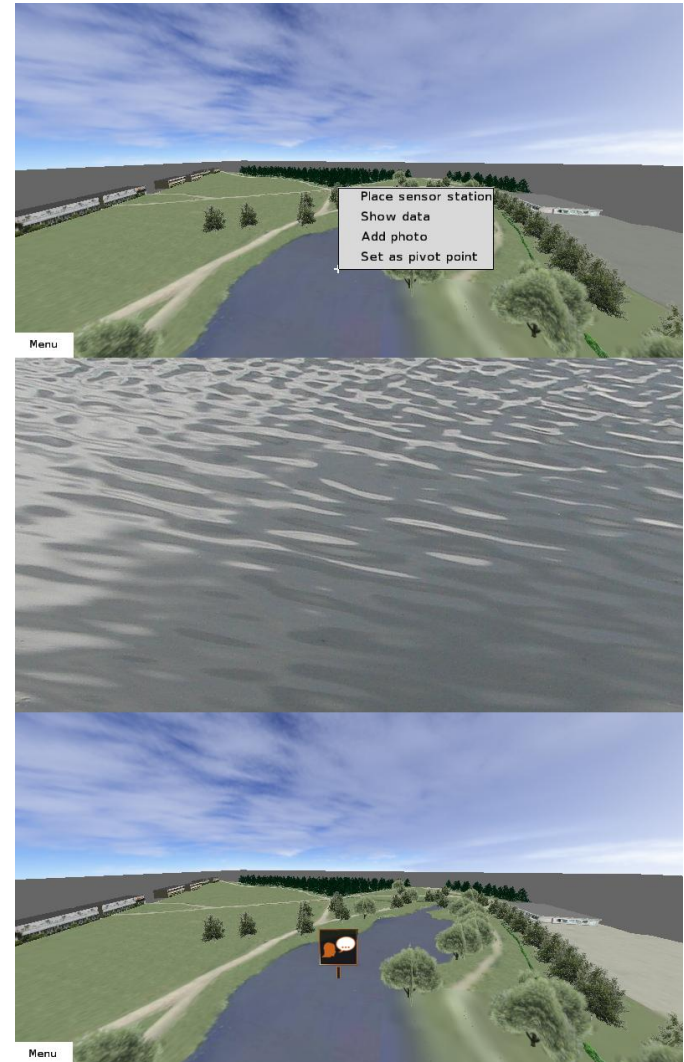
Supported platforms:

Mobile (Maemo, Symbian)  
Desktop (Linux, Windows)

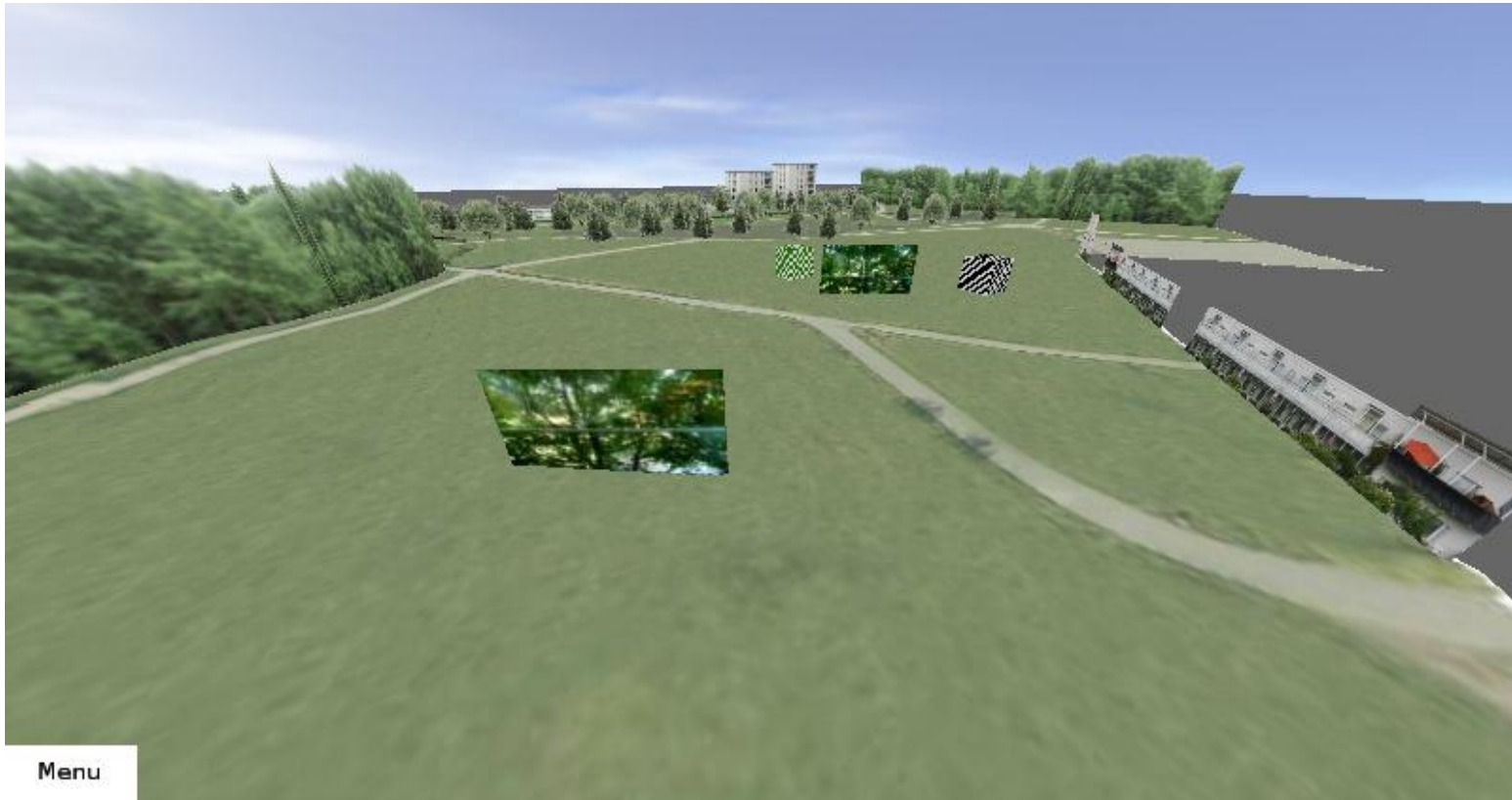
- 3D representation of the real environment
- Receive sensory data through Hydrosys data pipeline
- Augment virtual environment with sensory data, using different annotation types

# Photographic annotations

- Photo depicting actual state of an object in the environment
- Made by user while being in the field
- Synchronized in real-time to all other users browsing the environment
- Synchronization (packet forwarding) uses PVS based multicasting (NO broadcasting!)
- Using binary pub/sub protocol



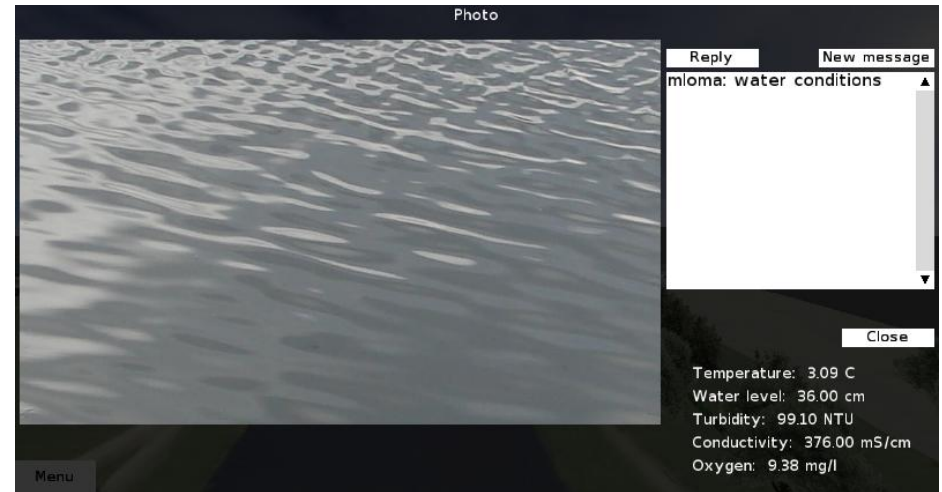
# Photographic annotations cont.



# Photographic annotations

Photo, discussion, state of the environment

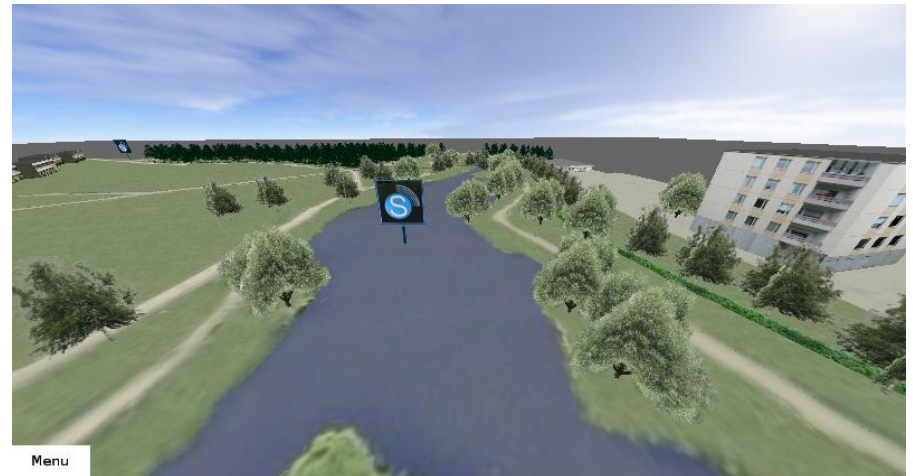
When selecting an object in the environment (pond, lake, ground etc.) user can see photo of the object, recent sensory data and discussion related to that particular object





# Sensory Annotations

- Depict locations of sensor stations in the environment
- Receive data from sensors deployed in the field in real-time
- Allow access to historical data associated with the sensor station
- Environment modified according to data received from the sensor station

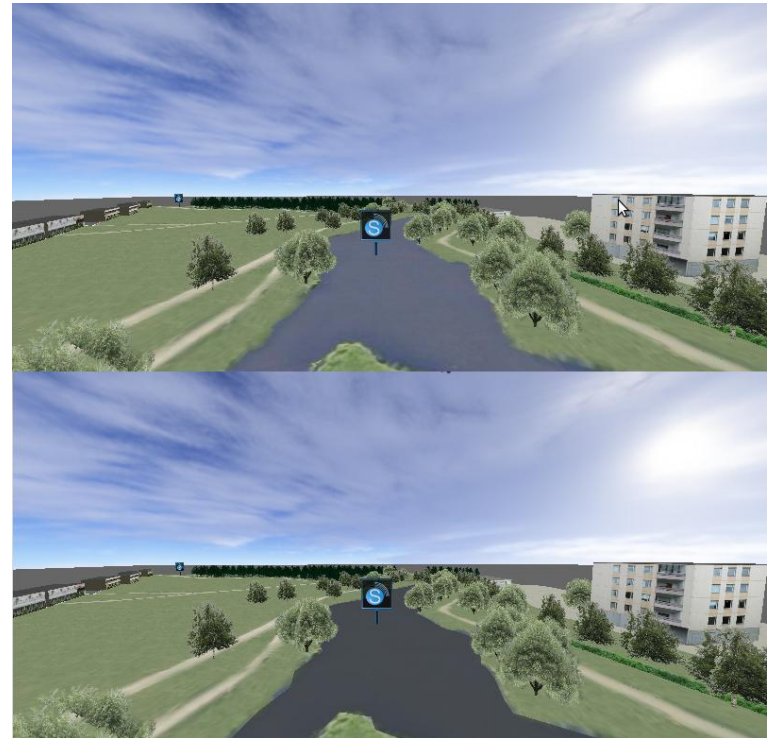




# Sensory Annotations

## Visualization of water turbidity

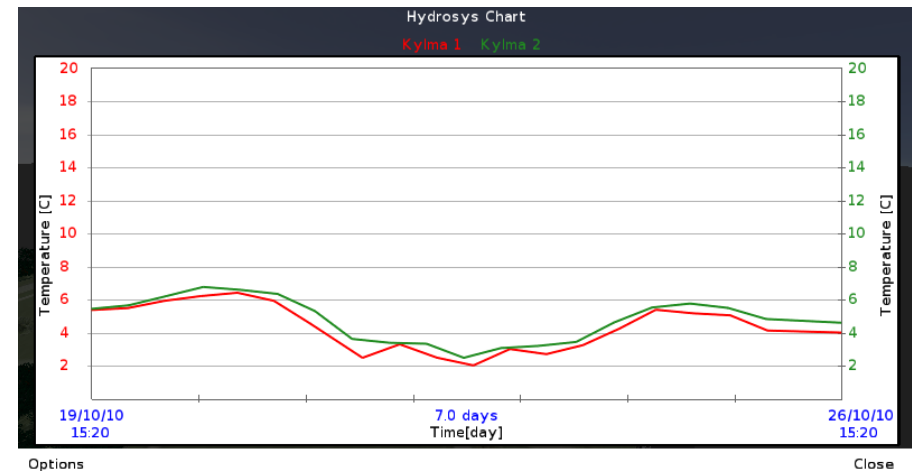
- Colorization of water changes based on turbidity values
- The higher the turbidity the larger is the weight of gray



# Sensory Annotations

## Chart visualization

- Based on end-user experiments, one of the most important visualizations for end-users is chart
- Visualizes sensordata in user-defined time period
- Allows to compare multiple values with each-other

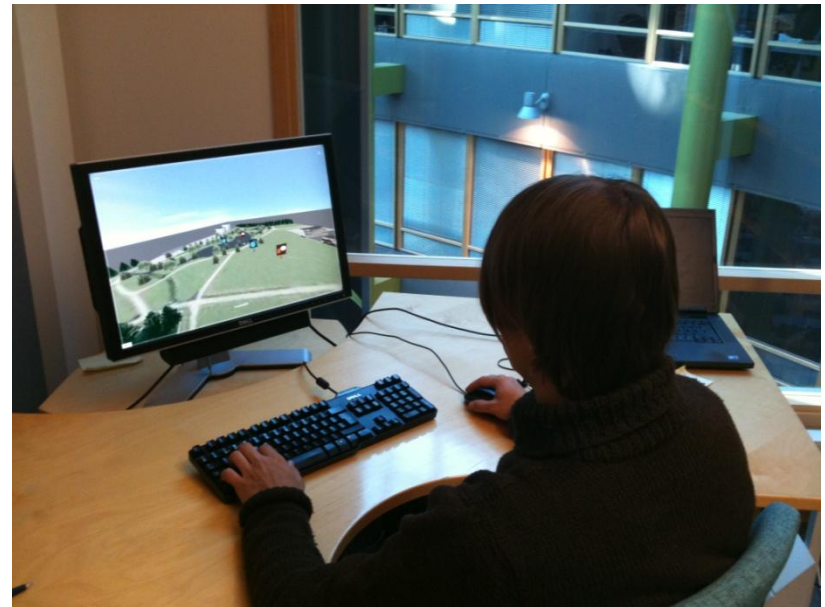


# Collaboration

User in the field



Supporting user in the office



Same data  
Same environment  
Real-time updates  
IM

→

←

# Conclusions

- Visualizing environmental data in it's actual context
- Annotations as a gateway to environmental information
- Sometimes users prefer simpler approaches (charts, abstract annotations)

# Thank You!

Questions?

Comments!