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On-Site Monitoring of Environmental Processes using Mobile Augmented Reality (HYDROSYS)
close gap between on-site and in-office work through usage of mobile applications

cell-phone and **handheld computer**
HYDROSYN focus
System overview
Mobile Augmented Reality
  Visualization, multi-camera framework
Outlook
EU funded project HYDROSYs

- Project in the field of environmental monitoring and management using mobile devices
- Project runs from 2008 – 2011
- FP7 / DGINFSO 224416

Major themes: interactive visualization, mobile computing, database systems, simulation, sensor technology, robotics
**TU Graz**
*Mobile augmented reality*

**EPFL**
*Sensor Networks, deployments*

**WSL**
*Deployments, simulation*

**University of Cambridge**
*Localization, unmanned aerial vehicle*

**Helsinki university of Technology**
*Cellphone interactive visualization, deployments*

**Ubisense**
*Localization*

**Luode**
*Deployments*
understand | communicate | share

improve the understanding and management of environmental processes in the field, complementing office-only work activities

Project focus
- Improved prediction and decision-making, solution finding and checking
  → Difficult to quantify
- Optimized data pipeline from sensor to handheld
  - actual access to *almost real-time* data and simulation results (pre-processed)
- Advance interactive visualization at handheld platforms

Expected outcomes
What does HYDROSYs offer?

Gather environmental data in field, send over network

Check, store and process data

Access data in field, observe processes in quasi real-time
system design
overlay „registered“ graphical information over live video imaging → „in context“

required: wearable display with very good sensors (≠iPhone!)

Mobile Augmented Reality
- Observe site from multiple perspectives by „browsing“ camera footage
  - Cognitively demanding!

Multi-camera framework
- Select and view various types of visualization
  - Live update of sensor data
- View site from various perspectives
  - Multi-camera framework
- Annotate / collaborate
- Manual sensing
Planning and performance in campaigns

- **Site setup (office)**
  - "GIS stage": site selection, problem identification, data gathering, conversion, geo-referencing

- **Campaign planning (office)**
  - Select and setup data sources (sensors), upload data, configure user communication, prepare simulations

- **On-site campaigns (in the field)**
  - Communication possible with in-office workers

Associated work process
- Environmental data types
  - ~25 data types
  - „normal“ weather data
  - Specialized sensors
- Stationary and mobile sensors
- Temporal aspects
  - Data update anywhere between ~60 minutes and ~minute
- Typical site size
  - Couple of hundred meters riverbed up to 12km²
  - Typically covered by 5 – 15 sensor(stations)
- Sensor data is stored in GSN
  - Various integrated simulation engines
  - Select simulation process through web front-end
- Simulation results need to be pre-processed
  - Semi-automated step using visual front-end
- Data communicated over WiFi bridges
sensor data (numeric)
sensor data plots
sensor data type labels (numeric) / isophotes
exocentric mode
Integrate various modules into one system
  - Visualization system available, annotate + multi-camera integration proceeding

Promote system
  - Open source!
  - www.hydrosysonline.eu

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Outlook and conclude