



*International Cartographic Conference 2007
Moscow, Russia, August 7*

**Testing the usability of well
scaled mobile maps for
consumers**



Usable well-scaled mobile maps



Dutch research project



keywords:

- user-centred design
- generalization
- mobile geo-applications

Outline

- Introduction
- Research project UWSM2
- Generalization for mobile geo-applications
- Methods for usability testing of mobile geo-applications
- Methods applied and put to the test (including a **new technical solution for field-based testing**)
- Proposed methodology for testing the usability of well-scaled mobile maps
- Conclusion



Research project on usable mobile maps



RGI- 3D Topografie - Windows Internet Explorer
http://www.rgi-otb.nl/uwsm2/

RGI- 3D Topografie

**RGI-233:
Usable(and well scaled)
mobile maps for
consumers**

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Project home Usable mobile maps

Today we see a huge increase of the use of geo-information in mobile devices. All current solutions are based on static copies that are stored on the mobile device. This makes dynamically adapting the map to new information and to the changing circumstances of the user impossible. With the availability of high bandwidth wireless connections (such as UMTS) better, more dynamic, solutions are possible: The server generates a proper, up-to-date map of the region of interest at the right level of detail for display and adjusted to the needs of the user. For a mass market (consumers of mobile maps) the human factors aspect is very important. The currently available mobile maps solutions still have insufficient user-interfaces. Extremely important is the issue of context as the user gets 'lost' very easily on the small mobile displays when zooming and panning. Based on a selection of use cases (navigation, tourist support, etc.), User-Centered Design techniques will be applied to develop small prototypes / simulations and the interaction and the quality of the maps in these prototypes / simulations will be evaluated.

The project runs from 2006 to 2008 and is organized in the following workpackages:
WP 1 'preparation' (month 4-9, 2006)
WP 2 'prototype development' (month 10, 2006 – 6, 2007)
WP 3 'evaluation of first prototypes' (month 7-12, 2007)
WP 4 'Improved prototypes' (month 1-6, 2008)
WP 5 'evaluation of improved prototypes' (month 7-12, 2008)

Contactpersoon **Peter van Oosterom**



www.gdmc.nl/uwsm2/

Generalization for mobile map displays



Multi-scale databases:

often multiple representation

drawbacks: redundancy, fixed levels of detail

Solution: scaleless / variable scale data structures

- single representation with additional structure to access at any level of detail
- often also spatial organization (clustering / indexing)
- progressive transfer: keep sending more details compare to raster formats: data pyramids, wavelets)

e.g. **tGAP structure** (van Oosterom, 2005)



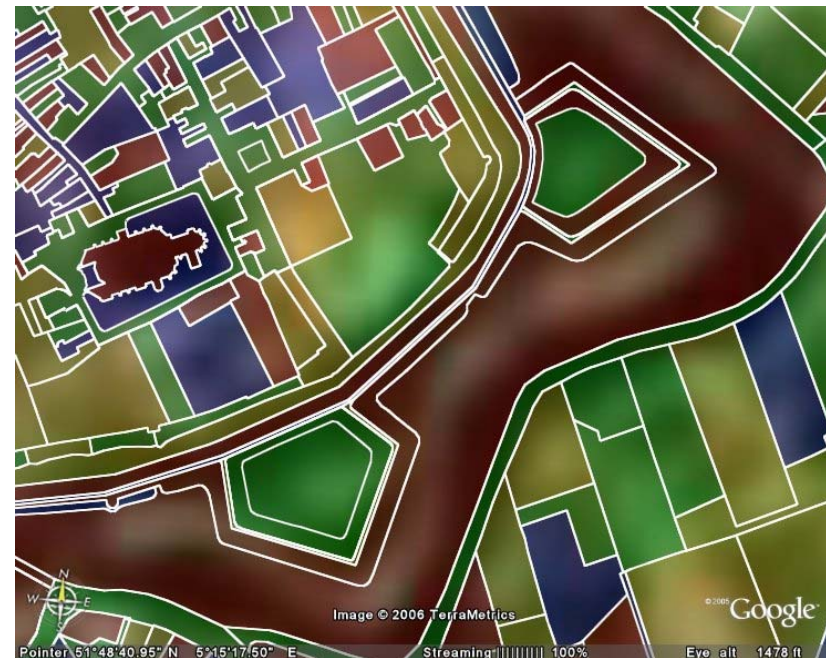
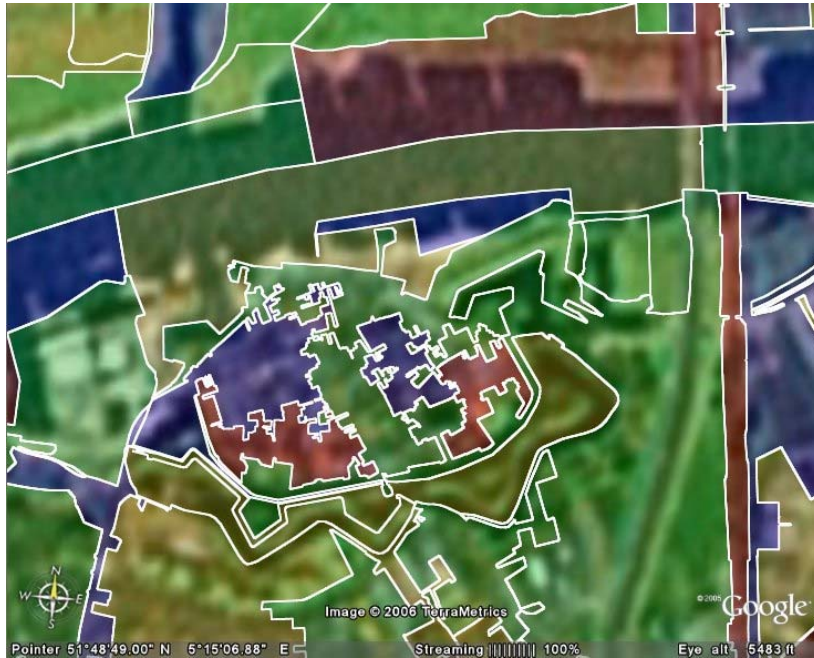
tGAP

topological Generalized Area Partitioning

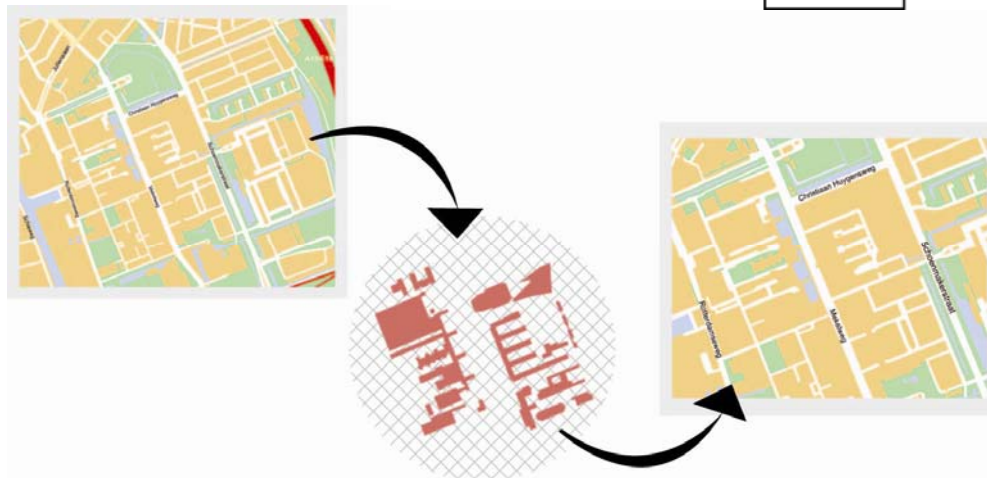
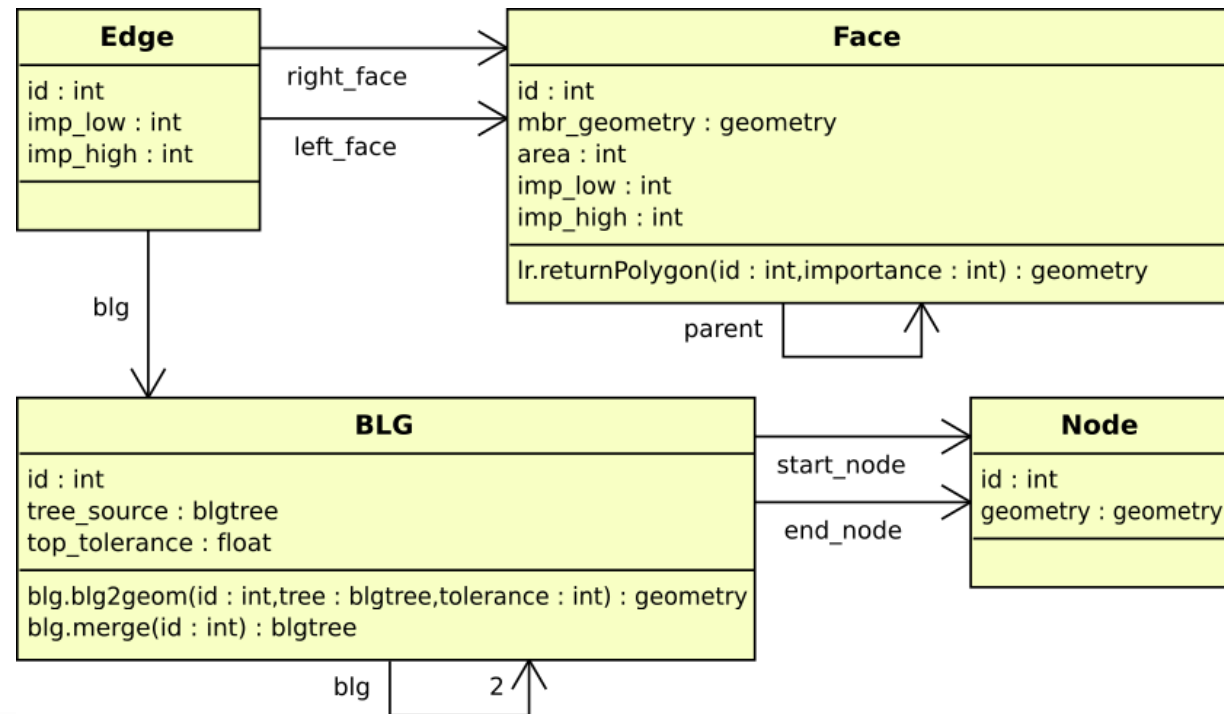


- data structure supporting vario-scale data
- store data only once, with no redundancy of the geometry
- derive different representations of the same data on the fly according to the level of detail required
- smooth zooming, realized through progressive transfer

Generalization experiments with tGAP



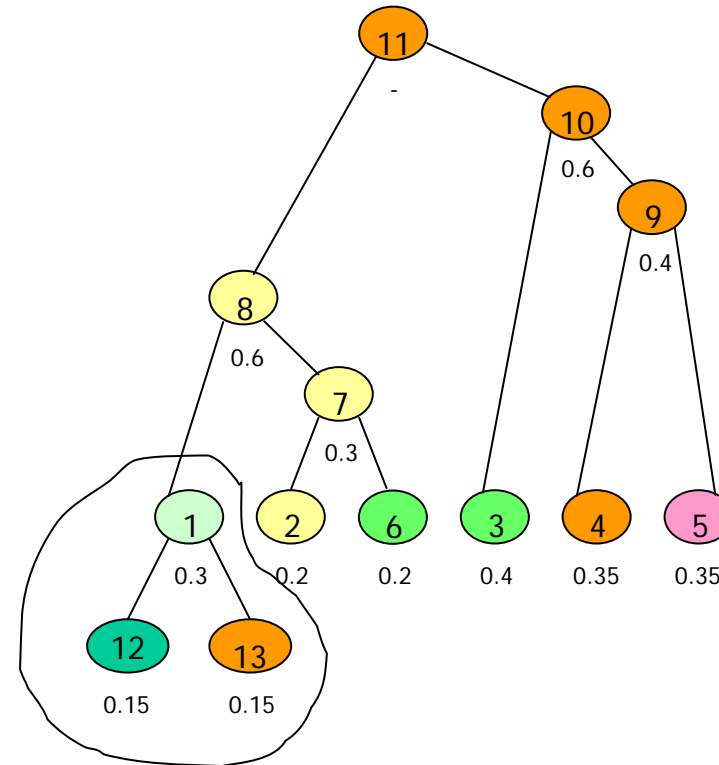
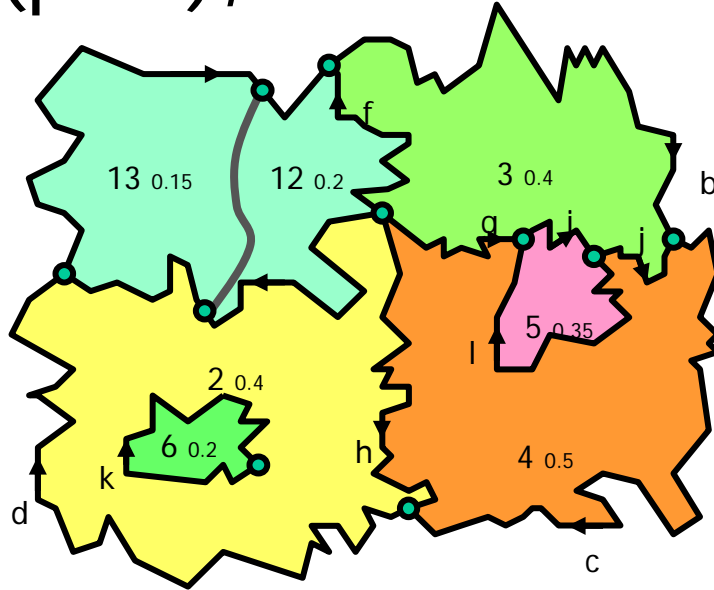
UML class diagram tGAP structure



tGAP structure and updating tGAP

Local update, control propagation effect

- types of update: split, merge, boundary change
- effect: face tree (branch), edge forest (part), BLG trees



Methods for usability testing of mobile geo-applications

- laboratory based
- field based

Most usability testing of mobile geo-applications in laboratory only!

Better to have combination of field and laboratory testing

but,

high amount of human resources required!

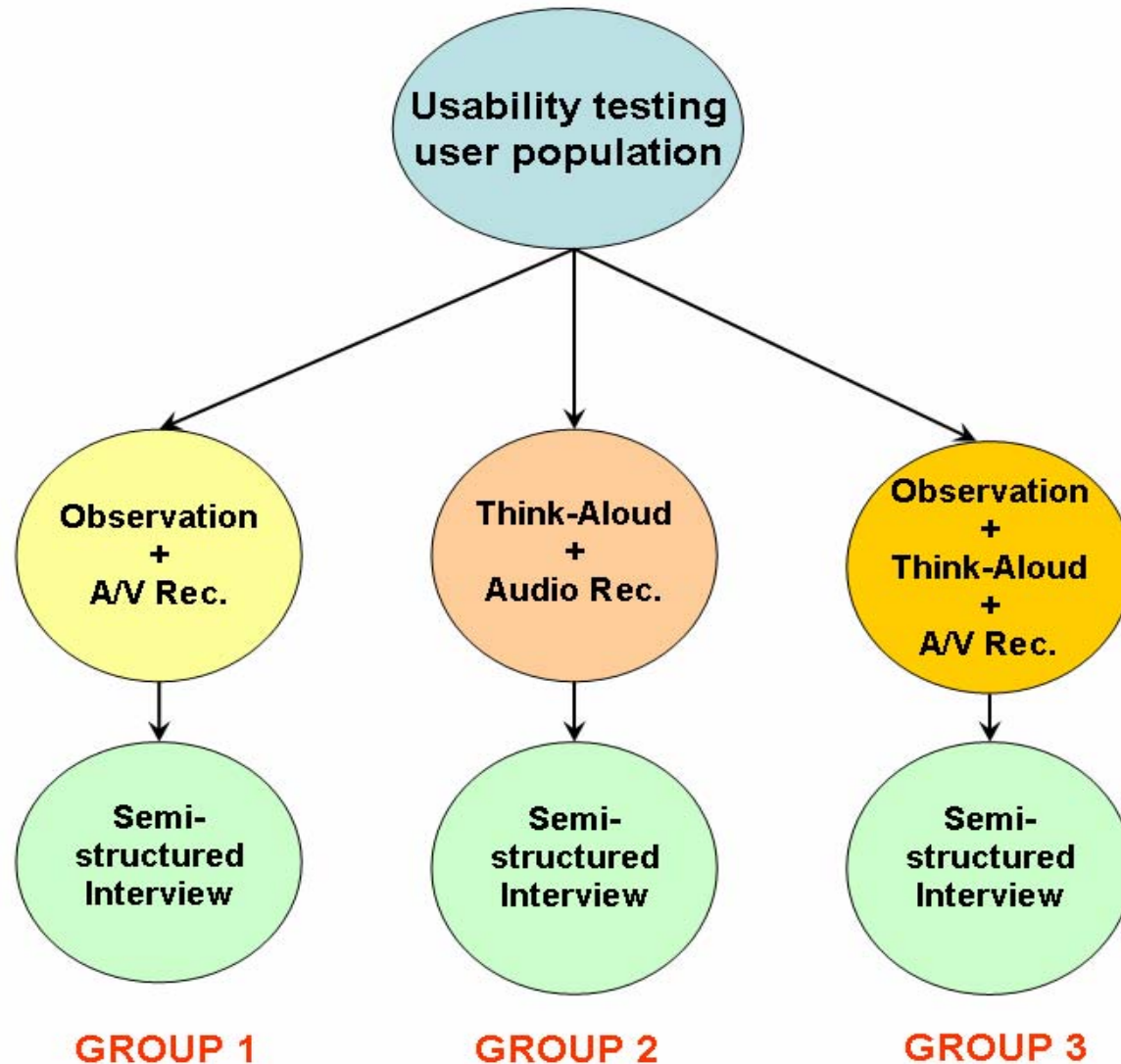
Methods applied and put to the test



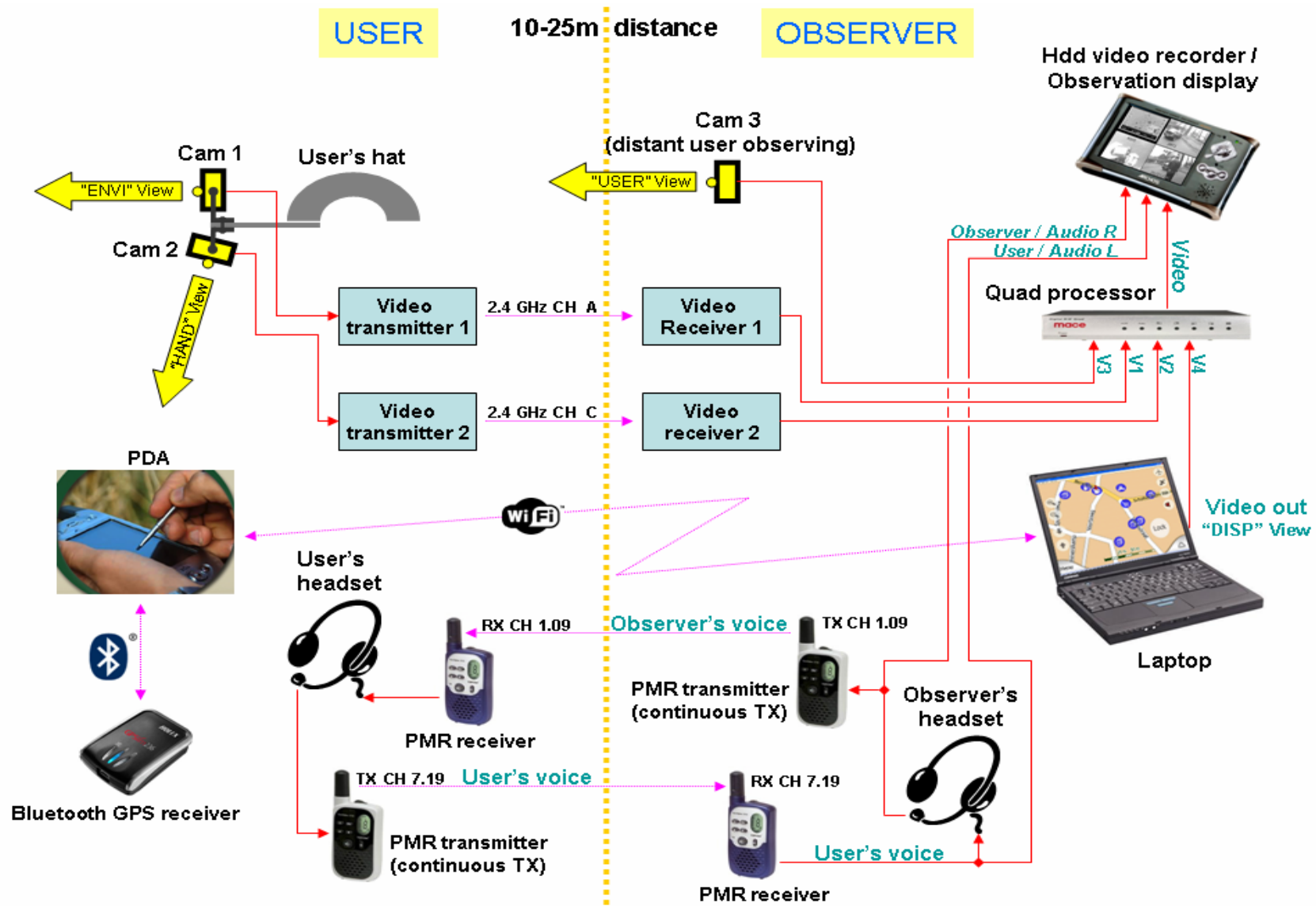
- observation
 - thinking aloud
 - video / audio recording
-
- semi-structured interviews



Put to the test: 3 possible combinations of research methods



Field based usability testing system implemented



Field survey execution



User



Observer

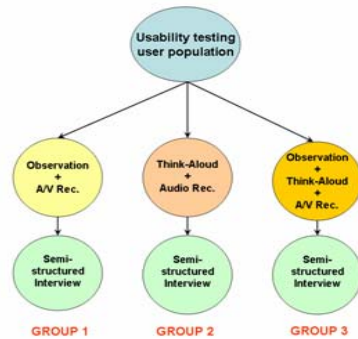
Field survey execution



Research materials: resulting video output



Combinations of usability testing methods put to the test



- 3 comparable user groups of 6 test persons
- unfamiliar test area
- scenario-based test sessions and navigation tasks
- test application = iGO My way 2006

www.i-go.com/en/

Proposed methodology for testing the usability of well-scaled mobile maps

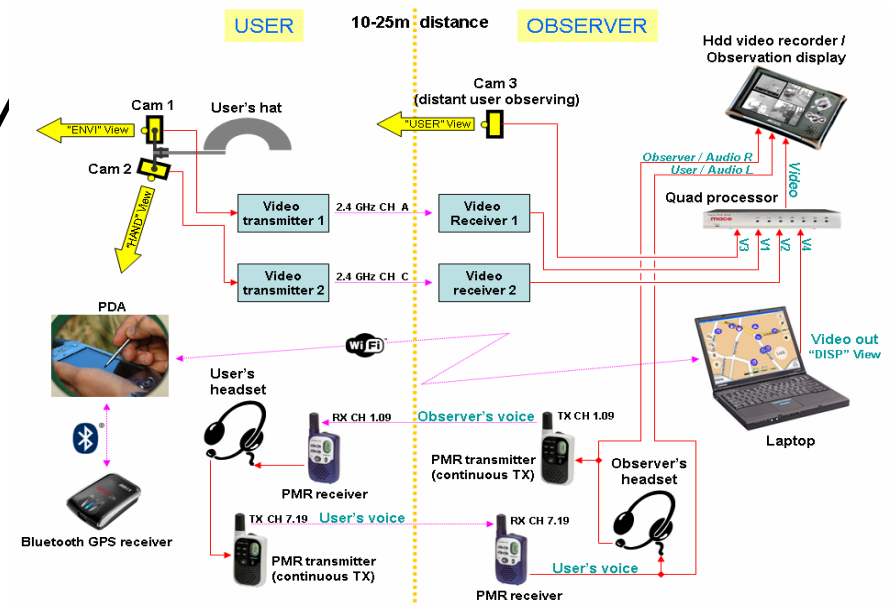


Combination of:

- observation
- thinking aloud
- semi-structured interviewing

with our new

- remote observing /
 - audio & video recording /
 - communication /
- system



Conclusion

- Increased use of mobile geo-applications
- In our research project: particular attention for generalization of map displays (smooth zooming)
- Need for user-centred design and evaluation
- Proposed methodology for testing the usability of well-scaled mobile maps



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