

RGI-233: Usable (and well scaled) mobile maps for consumers (UWSM2)

Internal Report Work Package 3

and other user research executed by lead partners ITC and TNO

Original plan for WP3: Evaluation of first prototypes

- develop *plan to test the user experience*
- select a representative group of users and some “extremes” (experts versus novices and elderly versus young people)
- use the prototype to *execute the tests* with real users
- summarize in *report and paper the results* of the user experience test
- provide suggestions for system improvements in same report mentioned above
- present results in *seminar*
- produce user experience evaluation *scientific paper* and *public paper*

Situation / results as of March 2008

- Field-based usability evaluation methodology for mobile geo-applications has been developed at ITC. Reported in various ways:
 - o Delikostidis, I. (2007), Methods and techniques for field-based usability testing of mobile geo-applications. MSc thesis, ITC, Enschede.
 - o Van Elzaker, C.P.J.M.; P.J.M. van Oosterom & I. Delikostidis (2007), Testing the usability of well scaled mobile maps for consumers. In: Cartography for everyone and for you. Proceedings of the 23rd International Cartographic Conference (ICC 2007), Moscow, Russia, 4 - 10 August 2007. CD-ROM. International Cartographic Association. Abstract in: 'Abstract of Papers', pp.239-240 (on paper). Presentation by van Elzaker at the Conference. Conference Proceedings.
 - o Delikostidis, I; C.P.J.M. van Elzaker & P.J.M. van Oosterom (2007), Usability testing dynamic maps – Overcoming limitations of mobile devices. In: GIM International, The Global Magazine for Geomatics, Vol.21, Number 12, pp.16-19. Scientific and professional publication.
 - o Van Elzaker, C.P.J.M.; I. Delikostidis & P.J.M. van Oosterom (2008), Field-based usability evaluation methodology for mobile geo-applications. In: The Cartographic Journal, Vol.45, 2, pp. 139-149. ISI Journal.
- In 2007, WP2 did not lead to a prototype that could be tested with representative users. Therefore, TNO designed its own prototype, based on the use case modelling executed, with emphasis on the user interface (and not on the generalization aspect). TNO’s output (next to the prototype application):

- Looije, R.; G. te Brake & M. Neerincx (2007), Usability engineering for mobile maps. Presentation at Nationale Geo-Innovatie Dagen, 14 March 2007, Van Nelle Ontwerpfabriek, Rotterdam.
 - Looije, R. (2008), WP2: Decluttering and prevention of occlusion for map-based applications. Internal report included in: RGI 233 Report Nr 2 'Usable and well scaled maps for consumers, Work Package 2, Delft, March 2008.
 - Looije, R.; G.M. te Brake & M.A. Neerincx. Usability Engineering for Mobile Maps. Mobility Conference 2007, Singapore, 2007. Presentation / Conference Proceedings.
 - Looije, R.; G.M. te Brake & M.A. Neerincx. Geo-Callaboration Under Stress. Mobility Conference 2007 / Workshop, Singapore, 2007. Presentation / Conference Proceedings.
- Original plan for WP3 could NOT be executed completely, due to the lack of a testable prototype that would reflect the original objectives of the UWSM2 project. That is:
- No detailed test plan could be made, as that would partly be based on the status and characteristics of the prototype (e.g. which area is covered by the sample data)
 - No representative group of users could be selected
 - No usability evaluation could be executed and, therefore, no results could be presented.

Way-out / new plan for WP3

Because of the fact that a testable prototype (involving real representative users) of the geo-mobile application that was originally envisaged could not be expected anymore, the consortium agreed with the following alternative research projects that still fit within the overall UWSM2 project objectives:

1. ITC executed a comparative examination of two existing mobile geo-applications.
2. ITC and TNO executed an expert (including heuristic) evaluation of the two prototypes developed in WP2: the one developed by TNO and the one developed by ESRI NL / TU Delft.
3. TNO executed an experiment with representative users of the TNO prototype.

Ad 1.

Two recent existing applications were selected for examination: *iGo My way v 8.0* and *Google (mobile) Maps*. The selection of these applications was based on a number of criteria, among which the possibility for “smooth zooming”, coverage of the Netherlands and the presence of POI’s and / or landmarks in the representation of reality. The first application (iGo May way) has a smooth zooming functionality. Google (mobile) Maps does not have that (map scale is changed in more abrupt steps), but is expected to be a market leader for mobile maps. As such, the latter application

was used as a “control case”. Part of the comparative analysis was a field-based usability evaluation with representative users, executed in Amsterdam (in co-operation with consortium partner Amsterdam Municipality (Fred Harms, Dienst Stadstoezicht) to match the RGI-233 use cases).

The paper with the outcomes of the comparative analysis was presented at a Symposium in Salzburg:

- Delikostidis, I. and van Elzakker, C.P.J.M. (2008), Geo - identification and pedestrian navigation with geo - mobile applications: how do users proceed. Presented at LBS2008: 5th Symposium on Location Based Services & TeleCartography, 26-28 November, 2008, Salzburg, Austria. Presentation.

and later on published as a refereed book chapter:

- Delikostidis, I. and van Elzakker, C.P.J.M. (2009) Geo - identification and pedestrian navigation with geo - mobile applications: how do users proceed?. In: Location based services and telecartography II: from sensor fusion to context models: 5th International Conference on Location Based Services and TeleCartography, 2008, Salzburg / ed by G. Gartner and K. Rehr. Berlin: Springer, 2009. ISBN 978-3-540-87392-1 (Lecture Notes in Geoinformation and Cartography) pp. 185-206.

Ad 2.

The expert evaluation of the two UWSM2 prototypes that were actually developed was based on three approaches:

1. the confrontation of the realized functionality of the prototypes with the original UWSM2 project goals;
2. overall cartographic assessment;
3. judgement whether the elements of the prototypes’ user interfaces follow a list of established usability heuristics (i.e. heuristic evaluation)

As the purpose of this exercise was just to learn from each other, the results of the expert evaluation are only published in the following internal report that is available to all partners in the UWSM2 project:

- Van Elzakker, C.P.J.M.; Looije, R.; te Brake, G.M. & Delikostidis, I. (2009), Expert evaluation of the UWSM2 prototypes. Internal report. 17 pages.

Ad 3.

Cluttered map displays on the small screens of mobile devices can lead to low task effectiveness and user satisfaction. TNO developed a prototype mobile map application in which three different declutter methods are implemented (“aggregate”, “spread” and their combination). Together with the original cluttered display this leads to 4 different map images on the display screen of a PDA in the TNO prototype. The purpose of the prototype was just to generate these 4 different displays so that they could be put to the test with representative users who had to execute different tasks, related to searching, locating, identifying and navigating. The results of the experiments with representative users will be published as:

- Looije, R., Brake, G., Neerincx, M. (2009), Efficiency, Task Dependency and User Preferences of Three Declutter Methods for Mobile Maps. Submitted to MobileHCI 2009

The three research projects that are described in this section were also presented together in a presentation at the GIN – RGI Symposium:

- Looije, R., te Brake, G.M., van Elzaker, C.P.J.M. and Delikostidis, I. (2008) Onderzoek van de bruikbaarheid van mobiele kaarten. Presented at the GIN - RGI symposium 2008: met het oog op de toekomst, 27 November 2008, Apeldoorn, The Netherlands. Presentation.

WP5: Evaluation of improved prototypes

It was planned that TNO (WP5 leader) and ITC would also be heavily involved in the evaluation of the final prototype(s). But in order to be able to do that, there had to be such a prototype, of course. As in the course of 2008 there were no more prototypes than the ones described in the section above, WP could not be executed.

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