Urban Planning with GeoMed - First User Experiences[1]

Barbara Schmidt-Belz, Thomas F. Gordon, Hans Voss
GMD - German National Research Center for Information Technology
D-53754 Sankt Augustin, Germany
E-mail: Barbara.Schmidt-Belz@gmd.de

Abstract

GeoMed (Geographical Mediation) provides an Internet-based support for spatial planning and decision making, like regional or urban planning. GeoMed integrates support for co-operation, negotiation and Internet mapping. This paper first introduces the concepts of the GeoMed system and its applications, then summarises the first experiences and validation results.

Keywords

Urban planning, Internet mapping, CSCW (Computer Supported Co-operative Work), Public participation

Authors' CV

Barbara Schmidt-Belz is a computer scientist with a long experience in different application development projects. Her special interests are in Information Engineering, Ergonomics and Usability Validation.

Dr. Thomas F. Gordon is a computer scientist, as well as a lawyer and a psychologist. He has worked in several research and development projects in the area of Artificial Intelligence. His special interests are in Computational Dialectics. He is leading the GMD part of the GeoMed project and has been technical co-ordinator of the whole project.

Dr. Hans Voss is a computer scientist. He has been leader of a number of projects in Knowledge Representation and Distributed Systems. He currently leads the research group on Co-operative Design. Dr. Voss was co-ordinator of the European feasibility study GeoMed-F, which then turned into the full-scale project GeoMed.

1 Introduction

"Collaborative Spatial Decision Making" is a keyword characterising the main features of urban and regional planning:
- Collaboration and communication of many actors is essential throughout the planning process.
- Representations of space (e.g. maps) play a central role in the planning process.
- Negotiation and decision making are crucial phases of each project.

GeoMed supports co-operation, spatial planning and decision making by an integrated concept of shared virtual workspace, Internet mapping and discussion forum. Together with some more services, this supports a wide range of tasks and user groups.

The concepts of GeoMed aim at improving urban and regional planning, including public participation. Our main goals are
- to make planning processes more transparent,
- to facilitate public participation,
- to help avoid or resolve conflicts,
- to facilitate and improve co-operation of planners, experts and communities,
- and, last but not least, to make urban planning more efficient, less time-consuming, and less expensive.

---

[1] Paper presented at the 4th European Digital Cities Conference, Salzburg, October 1998.

GeoMed is a joint European project[2], with five developing project partners[3] and four user partners[4]. After a feasibility study in 1995, the project was started in January 1996 and shall be finished early in 1999. A basic version of the GeoMed System was released and validated in summer 1997, and was since used to gain experiences and acquire new application projects. The full version of GeoMed shall soon be delivered to the user partners, and there shall be a phase of final validation and demonstration which includes the application of the system in several planning projects by all user partners.

2 Components of GeoMed

GeoMed consists of the components:

- **Basic support for co-operative work**, providing shared (virtual) workspaces[5], where owners define access rights and members can view or upload documents to share with other members.
- **GIS viewer**, allowing to view GIS data via Internet. The data remain on the server. The users on the client side can pan, zoom and select layers. Users can also add new layers and edit simple graphics or annotations.
- **GIS broker** and **Payment broker**, enabling new services, where GIS data can be offered for sale, respectively retrieved by spatial and thematic queries, ordered and paid.
- **Discussion forum**, where users can discuss any topic. The discussion should be structured as a tree or net of issue-position-argument hierarchies[6] and may be mediated by a neutral person (if participants are untrained, occasional users, like citizens) or not (if participants are experienced forum users, like planners or councillors).
- **Software agents**, performing notification and other services for users of a shared workspace or a discussion forum.
- **Knowledge-based system applications**, which allow to analyse plans with respect to special regulations on the basis of a knowledge base.

For an efficient use of GeoMed it was important to integrate these components. At the user interface, these components are recognised as several services of one system. The most interesting integration is that of GIS viewer and discussion forums. When the discussion concerns a plan accessible via the GIS viewer, a user can create a new layer and mark parts of the plan, and link the marks to his statements in the forum or illustrate his statements by sketching alternative solutions on the map. In this way, it becomes easier and more natural to discuss features of a spatial plan.

3 First Application Experiences

The basic version of GeoMed was submitted to a **validation process**, where two groups of users (16 employees of the City of Bonn, 11 Geography students, most of them with previous experiences in urban planning) performed tasks supported by GeoMed. This was done in a two-day's workshop for each group. After a brief introduction to the system, the users were given a scenario, roles to play and tasks to perform using the services of GeoMed. Finally, on the basis of these experiences, the users validated the system with respect to ergonomic issues and discussed its prospective benefits and potentials.

During the validation workshops, the GeoMed project got a thorough feedback from users. Apart from the validation aspect, this workshop also proved a good way to introduce and train planners in the use of GeoMed.

---

[2] funded in the Telematics Applications Programme as IE 2037 D13

[3] i.e. the German National Research Center for Information Technology (GMD), TNO-FEL and TNO-Bouw (the Netherlands), VUB (Belgium), Intecs Systemi (Italy), and Intrasoft (Greece).

[4] i.e. the City of Bonn (Germany), the City of Tilburg (the Netherlands), the Region of Tuscany (Italy), and the Technical Chamber of Greece.

[5] GeoMed re-implemented the shared workspace concept of BSCW, an extension of the World-Wide Web which provides a set of basic facilities to support information sharing and activity awareness in a working group across the internet, see Bentley et al. (1995).

[6] according to the IBIS model, see Kunz and Rittel (1970), and Gordon and Karacapilidis (1996).

Some months later, we had a chance to offer GeoMed (still the basic version) in an informal **public participation** of a planning project (concerning plans for a new housing area to be developed in a suburb of Bonn). For a period of two weeks, citizens could find the plans, explanations and more information in a GeoMed workspace. A discussion forum in GeoMed was prepared where citizens could input their statements. In the public announcement of the participation process there was also a reference to GeoMed. Of course, GeoMed was offered in addition to the traditional methods, e.g. a public meeting and the offer to write, or to talk to the planners during office hours.

A protocol of events in the workspace allows some cautious conclusions, though the event protocol does not reveal user names. In all, 760 events were registered, most of them "view" events, i.e. someone read a document. As the main plan document was viewed 109 times, this would be the maximum number of guests in the workspace. For comparisons: a public meeting at this time was attended by about 100 citizens. Usually only citizens of the neighbourhood of the planning area are invited and only a small percentage of these people are really concerned. Taking into account that this was the very first offer for citizens of Bonn to participate via Internet, this is not a bad result. On the other hand, none of the guests in the workspace has sent a comment to the discussion forum. We speculate that the reasons for this are partly the novelty of the medium and partly difficulties with the old user interface. A link to send comments about the system itself to the project team was not used once. In spite of these slightly disappointing results, the effort was worth while, because planners and other actors in the administration of Bonn gained experience in the new procedure.

GeoMed is also used for **co-operation of cities**, which is a quite different area of application. The City of Bonn is member of the European Transport Committee, and of a German initiative "Cities of the Future". GeoMed was offered to both groups. Workspaces with an appropriate structure, access rights, and information contents have already been set up. A tutorial for users shall be available soon.

4 Summary of experiences and lessons learned

4.1 Functionality and Ergonomics:

Some additional functions were asked for, but all in all, the functionality as specified for the full version of the GeoMed system was estimated appropriate to support urban planning. The project was encouraged to implement the functionality as planned.

The handling of the first version of the system proved inadequate and a substantial redesign of the user interface was required. The central user requirement after the validation was that the user interface should resemble the Windows 95/NT interface, because most users are accustomed to it. Another request was that there should be two or three different user interfaces, taking into account that there will be many user groups with different skills and needs, using GeoMed for different tasks.

4.2 Issues in the organisational context:

The first experiences made some issues obvious which would concern not only GeoMed but also any system which supports group co-operation, Internet mapping or public participation support.

Initial difficulties. Introducing a complex system like GeoMed to an organisation means a certain restructuring of procedures. Regional and urban planning, however, are subject to many legal regulations, which set constraints to reorganisation. This means an extra effort for some pilot applications, until new model procedures have been worked out.

Threshold problems. Many actors in many different roles take part in regional and urban planning. Whether these are individuals (like citizens) or organisations (like other departments, authorities or cities) - each one is free to join in using GeoMed or not. If a high percentage of actors does not (yet) use GeoMed, its use will show almost no profit. For the pilot applications the intensity of use has to pass a certain threshold, in order to demonstrate the benefits of this new support.

Media diversity. As long as some actors (like citizens) have no access to the technique required (or for some other reasons choose not to use GeoMed) the traditional media for co-operation and participation, especially paper documents, will continue to be important. The problem of providing and handling heterogeneous media is not only an initial difficulty but will persist for many years to come. The coexistence of paper documents and electronic data brings some well-known problems for administrations[7]. The coexistence of different communication media, however, is a chance. Face-to-face communication, meetings, or computer-mediated communication each have their special advantages and should be used in combination.

4.3 Aspects in the social and political context

Naturally, the first experiences described here do not yet allow a statement in how far GeoMed meets the above mentioned general goals. Many discussions with users resulted in rather ambivalent assessments of the prospective benefits and risks of GeoMed. Not surprisingly, they often came to the conclusion, that it depends on the way the system is used.

Some examples of issues discussed by users are:
- Does GeoMed facilitate citizen participation? Or will parts of the population be at a disadvantage because they have no access to GeoMed or do not know how to use it?
- When the process and the diverging interests of participants become more transparent, will this avoid or produce conflicts?
- Will planning processes become more efficient, or, on the contrary, more complex?

5 Acknowledgements

6 References and URLs:

http://nathan.gmd.de/projects/zeno/geomed/overview.html about the whole GeoMed Project.
http://nathan.gmd.de/projects/zeno/zenoSystem.html about the GeoMed components basic support and discussion forum (developed by GMD, named Zeno).
http://www.ucc.ie/hfrg/baseline about the baseline project.
Bentley, R., Horstmann, T., Sikkel, K. and Trevor, J. (1995): Supporting Collaborative Information Sharing with the World Wide Web: The BSCW Shared Workspace System, in The World Wide Web Journal: Proceedings of the 4th International WWW Conference, Issue 1, December 1995, pp 63-74.
Fitzke, J., Rinner, C., and Schmidt, D.(1997): GIS-Anwendungen im Internet. In: Geo-Information-Systems 6/97, pp. 25-31.
Gordon, T., Karacapilidis, N., Voss, H., and Zauke, A. (1997): Computer-Mediated Co-operative Spatial Planning. In: Timmermans, H.; Decision Support Systems in Urban Planning, E & FN SPON Publishers, 1997, pp. 299-309.
Gordon, T.; Karacapilidis, N. I. (1996): The Zeno Argumentation Framework. In: Proceedings of the Workshop on Computational Dialectics: Models of Argumentation, Negotiation and Decision Making, International Conference on Formal and Applied Practical Reasoning (FAPR96), Bonn, Germany, June 3 - 7, 1996
Kunz, W., and Rittel, H. (1970): Issues as Elements of Information Systems. Working Paper 0131, University of Stuttgart, Institut fuer Grundlagen der Planung, 1970.

---

[7] Such problems include the double effort of providing information both on paper and via Internet, to archive and retrieve both paper and electronic documents in a planning process, or to update and control versions in redundant, distributed information bases.

Laurini, R., and Milleret-Raffort, F. (1991): Principles of Geomatic Hypermaps. In: Proceedings of the 4th International Symposium on Spatial Data Handling, Zurich, Switzerland, July 23-27, 1990, pp. 642-651.

Schmidt-Belz, B., Märker, O., and Purtschert-Voss, C. (1997): Validierung einer WWW-basierten Unterstützung für die Stadt- und Raumplanung. In: Salzburger Geographische Materialien, volume 28, pp. 391-396. Salzburg, 1997.

Ziegenhagen, U. and Seelbach, M. (1998): GeoMed – ein internetbasiertes neues Medium für die Regional- und Stadtentwicklungsplanung. Zwischenbilanz eines Forschungsprojektes und seine Zukunftsrelevanz für die Praxis. In: Raumordnung und Städtebau in der Informationsgesellschaft. Heft 1/1998. Bundesamt für Bauwesen und Raumordnung. Bonn.