A database system for social housing management

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During the eighties the Institute made an extensive inventory of the social housing in the region of Brussels, Belgium. Different information like architectural quality, urban context, social background of the inhabitants, demographic situation of the quarter, technical situation of the building, and so on … were registered in a paper-based publication. Text and photos were all published in a classical way and made available for the different decision makers.

As the inventory was published on paper, it is almost impossible to make fast simulations out of the data available.

In the near future, the inventory will be updated. As a result of the previous experience, a different approach has been adopted. In collaboration with a specialised software house, a prototype has been developed. A very simple but powerful cartographic viewer is combined with a common used alphanumeric database. In this way, basic information like cadastral vector maps, scanned images, plans and maps and the alphanumeric data can be treated as logical objects. Other visual documentary information, like photo's, video, scanned images, etc. … are also linked to the kernel data. The whole is made Internet-ready, although the first distribution will probably be made by CD-ROM.

Techniques out of the 'classical' cartographic systems are adopted but used in a simpler way. The latter are also strongly adapted to be used by non-experts and decision makers. In the future, decisions will be based on a series of fast simulations, thematic maps and alphanumeric queries. All kind of information is directly available. The project makes known techniques available for occasional users.

In the paper the technical set-up of the system, the specific value for the social housing companies and the future possibilities and limitations for distribution of information will be formulated and illustrated.

History and background

In Belgium, social housing and its activities are often the exclusive domain of small organisations (social housing companies) mainly depending from the local authorities and operating in a limited district. Following the rergonalisation in 1989, there is one Regional Housing Company for brussels, unifying all local organisations. These local organisations are managed by local renters, deciding themselves on the rent and public investments. Their discisions are freequently opesed to the general strategy of the Brussels regional Housing Company. Due to historical reasons there is an obvious lack of information and overview for planning and professional management. With the on-going governmental re-structuring in Belgium during the last decades, different attempts have been

undertaken to get things straightened out in this sector. One of the main instruments to be used for this reorganisation and for breaking open the discussion, is the set-up of an up-to-date inventory for social housing in the region of Brussels. The final goal of the study and inventory of socail housing is a financial estimation of all social housing in order to establish more fare rents and more consistent planning of the renewal activities.

In the eighties the government of the Brussels Region ordered a first screening of the situation. The *Sint-Lucas Werkgemeenschap*, a known centre of expertise in the field, made a paper-based inventory, integrating different kinds of information as there are architectural quality, urban context, social background of the inhabitants, demographic situation of the quarter, technical situation of the building, … Although carried out within a very short time schedule and by a limited number of people, the information brought together was very accurate and coherent. The inventory could have been a instrument for active and strategic decision making. As it was published on paper, it was almost impossible to make fast simulations out of the inventory.

In the near future, the inventory will be updated. As a result of the previous experience, a different approach has been adopted. Making use of recent IT-technology and available GIS(Graphical information system)-data, an organisational and computer-based prototype of data-structure and consultancy-tool was developed. This will be used in the near future to renew the inventory. This prototype and consulting tool will be described in the sequel.

Basic specifications for the prototype

GIS-technology is well-known and broadly available. This technology is very often only applicable on complex platforms and environments, and is in most cases rather difficult to use. Therefor a different approach was adopted. As the development of complete new software was impossible within the project, the decision was made to look for a combination of existing packages that do (parts of) the requested functionality.

Within this context, the basic options were formulated as follows:

1. use of existing solutions/packages with an open environment (ideally based on and linked towards GIS technology);
2. object oriented (transparent use of Graphical and Alphanumeric Data);
3. distribution of information (networking);
4. user friendliness (very low training cycle);
5. simulation capacities;
6. evolutionary IT architecture, openness towards future evolution.

These basic options were translated into a set of ‘bench marking’ and functional specifications, as to facilitate the selection of the appropriate tools and packages.

1. Cartesian GIS environment, with basic drawing commands;
2. link to alphanumeric data;
3. possibilities for combined media (multi-media);
4. user-friendly interface;
5. user profile definition, i.e. possibilities to create different user and complexity levels;
6. possibilities to be used in networking (Internet, intranet, …);
7. simple querying possibilities based on a SQL(Standard Querying Language) like language;
8. powerful simulation environment;

9. applicable on popular computer-platforms.

Data-model and information-types

Before we explain the IT-architecture, we need to look closer at the data that has to be handled by the system. The application's database consists mainly of two opposed kinds of information types. We distinguish graphical data and alphanumeric data. Moreover there is additional documentary data.

The *graphical information* consists of vector-based maps situated in a general GIS co-ordinate system, which is in this project the Belgian LAMBERT-system. A real GIS-framework was chosen. This enables the use of different kinds of information-sources. Moreover it offers an accurate and mathematically correct system to make simulations and to derive information from.

As main source for setting up the GIS database, URBIS, the Urban Brussels Information System, was used. In particular cases however, the information from URBIS may be completed with other basic data of different origin (general information versus project detailing) or in different formats (DXF, DGN, scanned images, …).

The *alphanumeric information* was structured according to information-categories used in the first paper-based inventory. In a first implementation, we will make distinction between Projects, Building Phases and Parcels. They are hierarchically structured in a one-to-one relationship according to the level of information.

- *Projects* contain mainly general and objective information on a social housing quarter, like administrative information, a general description of the different building phases throughout the years and specific global objective documentation.
- *Building phases*, on the contrary, add subjective information like appreciation on architectural, urban, social and technical quality of each phase of a project evaluated at a particular moment.
- *Parcels* still go further and detail a momentary situation of every housing unit. Here the technical situation of the building is the most important.

Graphical and alphanumeric data are closely linked to each other. Projects, Buildings Phases and Parcels are represented as surfaces in the GIS database. Logical object-files are used to build surfaces and their alphanumeric records. Clicking on a graphical object (e.g. a Project) causes the querying of the alphanumeric record. Vice versa, from within a record a project can be located in the graphical database on a specific scale of visualisation and will then be shown. This close and direct relationship between the two types of information is the main advantage of the created application.

Documentary information (video-movies, scanned white papers, photographs, audio-recordings, …) is used to detail and complete the formal information in the above described databases. It makes part of the logical objects and can be very important data.

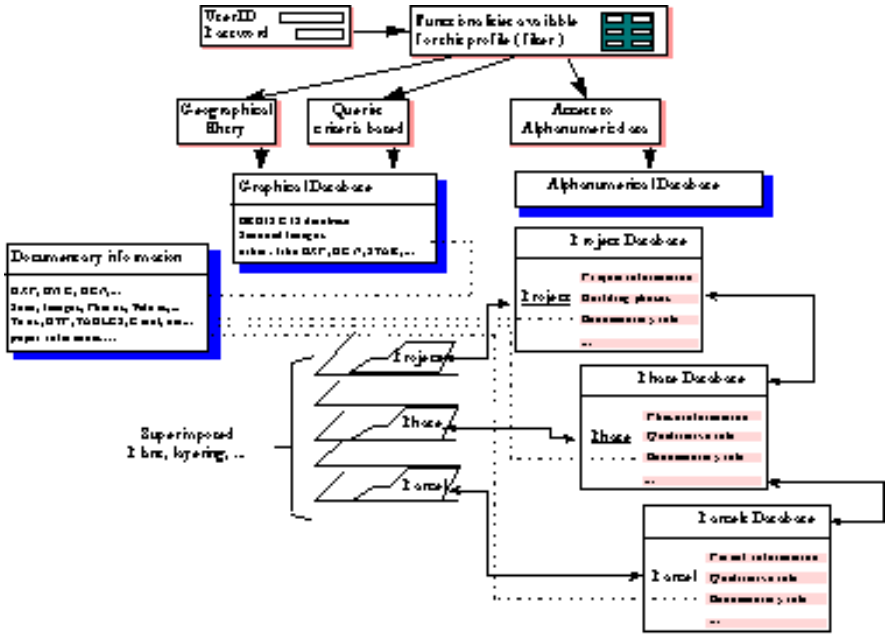

Figure 1: Data-model.

During a first phase, the database will not be fully operational. All information on Projects and Building Phases will be registered by a special and temporary team. The Parcels database on the contrary, will be updated in a later phase and by the client services themselves as this will take much more time and practical work. A possible further step will be the detailing of each parcel in it's composing housing units, each housing unit in it's different rooms and so on , … The open structure of the data-model permits this evolution but the implementation takes still more time.

IT-Architecture

The heart of the IT-architecture is build around two powerful but user-friendly applications, one for each type of data: STAR VIEWER for the graphical information types and documentary files of all kinds and MS ACCESS for the alphanumeric data-storage. Both kernel products are linked by an ODBC (Open DataBase Connectivity) link. Both commercial products were selected on bases of a series of qualitative parameters, but the assembled application itself is not depending on anyone of them. They are interchangeable with other products whenever needed (e.g. as newer applications become available or as newer releases offer more features and possibilities). It seems interesting to recall the most important qualitative parameters that form the basis of selection.

STAR VIEWER is a GIS-viewer application for consulting large cartographic databases in heterogeneous (UNIX + WIN) networks in client-server mode. It offers features as application access based on user-profile-definition, mathematical preciseness, multiple GIS-data format support, combined use of vector and raster information, … The data-access is very fast and it supports fully OLE(Object Linked Embedding)-objects and ODBC linking which is very important for it's embedding in a WINDOWS environment. Specific menus permit the building of SQL-queries based on both alphanumeric and graphical information.

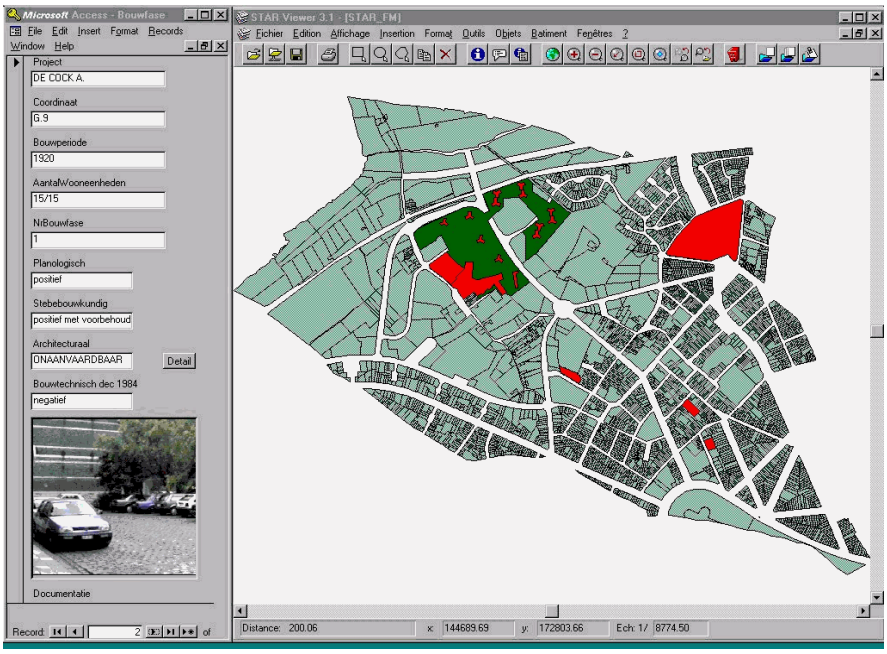

Figure 2: Sample view of the working environment, with the graphical GIS-database on the right and the alphanumeric record information on the left, including a piece of video.

ACCESS is a well known and wide-spread database application. Although it does not offer all the possibilities of RDMS(Relational Database Management System), it's users-friendliness and openness have determined the choice for the prototype.

A decision supporting instrument for Social Housing companies

We will differentiate between different types of functionality in the use of the described database-system. There are the manipulations to administrate the system, update the database, develop new forms and queries, … These manipulations are mostly executed by experts or experienced users of technical departments. Due to it's Client/Server technology, users can even choose between different environments: the complex but powerful GIS basic software on a unix platform or the more user-oriented windows interface in the client mode.

This is however not what this application is created for. It is on the contrary, oriented towards all these other users, these occasional, non-experienced users that find it difficult to use computers in the same logical way every time. It is for this group that the consulting and management functions and possibilities have been prepared and tuned. The currently implemented possibilities can be devided into the following categories: 1. consulting and visualisation functionality; 2. querying and management functionality; 3. simulations (thematic and statistics).

The *consulting* functionality represents mainly functions that are limited to the use of one or very few logical objects. It represents basic functions like getting information on a project, phase or parcel by simply pointing to it on the map; locate a particular project, phase or parcel on base of its characteristics; navigate through the building phases of a project, or the parcels of a phase; print-out of maps and/or listings of projects, phases or parcels; …

By their interactive character, these functions offer already more possibilities than the paper-based inventory of the eighties. The information available is identical, but there are now consulting facilities available. By some simple clickings, the user can find linked information. Moreover, the tool can be used through networks. The environment is very user-friendly, so there is no problem for

anyone to use or consult the database nor to use it.

But as pointed out above, the application offers much more possibilities. *Querying* the databases by alphanumeric or graphical entries, or by a combination of both, permits the analysis of large series of objects and the easy visualisation of it's results. Some examples: list/visualise all projects of a particular company; list/visualise all projects which do or do not respond to a certain basic quality; list/visualise all phases executed within a certain period; list/locate all parcels that will be checked within the next week, as to optimise the checking schedule, …

The results of these queries can be visualised, listed, printed or plotted in a very short period of time. Within some seconds, or at most minutes, the user can read the results of his query. This turns out to be one of the main advantages of this solution. Moreover, the combination of alphanumeric data with graphical GIS mapping is in this case very interesting. The readableness and interpretation of the results is much richer than both types of information can offer on it's own.

To lower the training and knowledge need, specific interactive wizards have been developed to make SQL-like querying accessible for non-experts. These wizards are based on the extensive use the objects and their characteristics and formulated in the user's language.

This advantage of alike feature is still more obvious while exploiting the functionality to generate thematic maps, statistic information and make *simulations*. Data can also be interpreted and organised. Some examples are: the visualisation and ranking of all building phases according to their technical quality; the visualisation and ranking of all parcels that have to undergo reparations and according to the trade of work; the ranking of the companies according to the level of technical quality of their projects; the relation between the implantation of projects and the social structure of the town quarters; …

It is the combination of all these possibilities that make the application interesting. Certainly, the unique combination of graphical and alphanumeric output produced in a very short period of time, makes a lot of invisible information available and visible and more importantly, manageable.

Graphical and alphanumeric data are brought together and are linked to each other. Moreover, documentary background information is added. The implementation facilitates easy consulting, querying and simulations. All these action are executed in a very short period of time by current normal machines. By doing so the application supports the decision making process undoubtedly in a high degree.

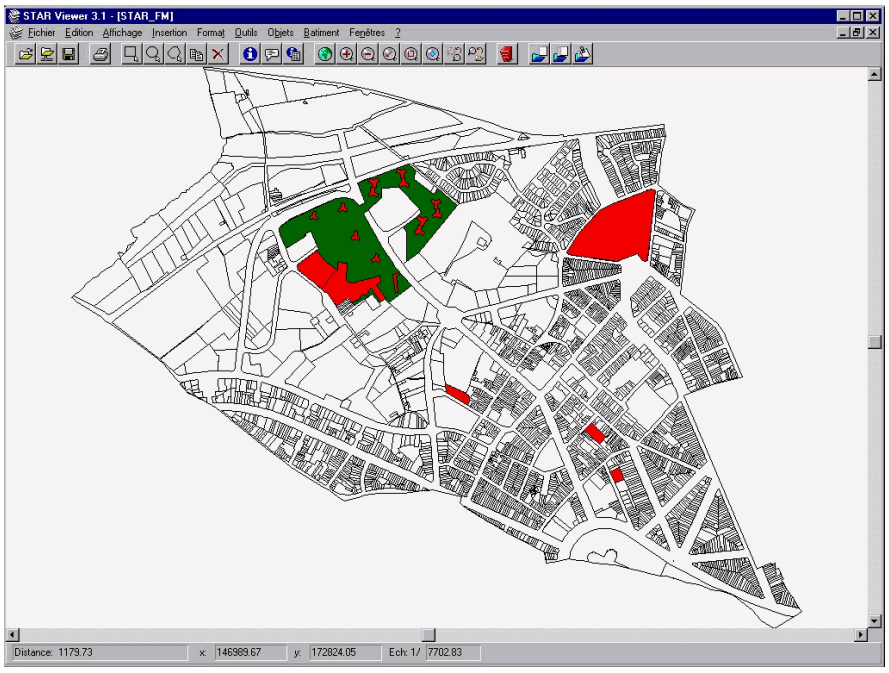

Figure 3: View on the result of thematic mapping with STAR VIEWER.

Future evolution and database maintenance

After the first phase (updating information and set-up of the system), the challenge will definitely be to update regularly the data in the different databases. This is of course not depending on the system. But a user-friendly environment is more inviting to keep track of lacking information. However, as this is frequently the direct cause for failures, it is important for the good functioning of the system, only few data are really indispensable. We are talking about the project and building phase information. Everything else is optional.

The system is ready for consultations through the Internet or through an internal intranet. This opens future possibilities for the on-line consultation by the services of different (social housing) companies, and eventually also by renters themselves.

Conclusions

The application is not having a rich and extended functionality. It is not extremely user-friendly nor is it some kind of new IT-architecture. It is rather the combination of all these aspects together with its data distribution capacity that makes it worthwhile. The objective was clearly not to invent new possibilities, but rather to implement and adapt existing technology in a user-useably and appropriate way for the problem of social housing decision making.

As good as inventing new possibilities, this is a also a fundamental challenge !

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