

1) Title of the case

National Land Information System Development

2) General description of the organization and/or project

The Estonian Land Board (ELB) is acting under the Ministry of Environment and is responsible for the maintenance of the Land Cadastre, co-ordination and execution of the land reform, co-ordination of the activities in the field of land consolidation, land assessment, geodesy, cartography and geographical information. ELB also manages contracts for cadastral and geodetic surveys, and for topographic mapping. ELB is a public body implementing the national land policy and providing the community with geospatial data.

The Land Board employs about 250 persons (2005), of whom 100 are in the Board's Tallinn headquarters and the remainder divided between 15 County Cadastral Offices. The activities of the Board are financed 100% from the state budget. All revenue earned by the Board goes back to the state budget. The total budget in 2005 was 6.4 million Euros.

ELB is responsible for developing the Estonian National Land Information System (LIS) that provides the foundation for the Estonian National Spatial Data Infrastructure. LIS's core is formed by the Cadastral Information System (CIS) that consists of the Land Register (i.e. the Estonian name for the cadastral register), cadastral maps and the archive. CIS is mainly a tool for data registration including integrated alphanumerical data and spatial data registration, management information, summaries and views of cadastral data and thematic maps. An important part of LIS is the Web Map Server enabling the public to view and query information from the registers integrated into LIS and view topographical maps and thematic data layers on the web. The most recent part that has been integrated into LIS is the Land Use Restrictions IS and web-based tools for spatial data management.

3) The main content of your case

The Land Information System development includes:

1. Flexible design and development planning in the long-term, continuous and innovative information system development process –the development of LIS was carried out from 1999 to 2005 in the rapidly evolving environment of information and communication technology;
2. Conducting IS development outsourcing (purchasing process) through public tendering and effective management of resources and partnership and quality control;
3. Making spatial land related data available for the public (front-office), data quality assurance, performance management (back-office) and continuous data quality improvement;

4. Co-ordination of spatial data management at the state level, including the provision of free tools for spatial data management for public sector organizations. Incorporating extensive co-operation with many public sector organizations in the field of spatial data management and re-use of developed LIS features (tools).

LIS provides powerful features for collecting spatial data, ensure data quality, distribute data in the interests of all groups of society (the state, local governments, private sector, individuals). The LIS organization is based on long-term mutual relationships with customers, suppliers and partners. ELB has been creating and providing web-based map services for land surveyors, land advisers of local governments, the National Road Administration, the National Heritage Board, notary offices, utility companies, etc. LIS has also facilitated the planning of land resource utilization, public administration and services, access and publication of data, especially spatial data in other databases.

The availability of land-related information raises the awareness of society about the condition of land and the related processes. The statistics of usage of public and free of charge web-based services indicate a great public interest in the services provided by LIS. The main groups of users of public services, which provide easy access to land-related data, include private persons, many companies (especially real-estate companies, forestry companies, agricultural companies to name a few) and of course the public sector with all varieties of governmental institutions both at the state and municipal levels. Customers use more and more LIS-based implementations in their work processes. A re-use of implementations based on the universal components of LIS enables us to save resources and introduce solutions in new fields of business.

4) The reasons behind the case

The maintenance of cadastre, i.e. keeping account of land resources, is one of the major tasks of the state. Without LIS it was impossible to perform state functions successfully, e.g. to carry out land and property reforms, maintain the Land Cadastre and keep account of and provide the society with information on the objects causing restrictions to the land use. There were no effective IT solutions available for spatial data management, provision of public services based on spatial data and meeting the demands of customers, therefore it was necessary to create a well-functioning geographical information system from scratch.

5) The actors behind the case

The Land Board's managerial staff was responsible for the process. During the Phare project there were two parties involved: the Phare project team (experts) and the Land Board team consisting mostly of cadastral staff. In the course of further LIS development, in which the Land Board was the contracting authority, a Steering Group and a Project Group were formed for outsourcing the development work. The Steering Group included the Project Managers of both parties as well as representatives from the Land Board's management and from the IT company management. The Project Group consisted of

both Project Managers and specialists from different ELB departments and from the IT company. Each year the composition of the Project Group was reviewed according to the particular themes in order to involve the most competent specialists of the field. The representatives of ELB, as a customer, were included in the process from the very beginning. Through an interactive software development process constant feedback from clients was guaranteed from the beginning of the development process.

In cooperation projects with different organizations, which aimed at the introduction of web-based tools created during LIS for viewing and management of spatial data, the major clients were public sector bodies in cooperation with whom ELB developed thematic map applications. Regardless of the fact that many parties were involved, the development of map applications was carried out in a constant and very close cooperation between the specialists of both sides from the beginning to the end of the process.

6) The process leading to success

Within the framework of the Phare project in 1999 overall and long-term objectives were defined – strategic goals were set and these were later adjusted according to the development of the Land Board's strategy. Both the strategy document and the implementations plan were prepared. On a yearly basis the development needs of different fields within the organization were mapped. Such development themes that were important for the whole organization and corresponded to the strategic goals were collected, discussed and evaluated. Based on that, a budget application was made in order to get finances from the state budget for IT development. After having received necessary financing from the state budget, the contracting process of development work was started during which the Land Board's specialists prepared specifications as accurate as possible and the priorities and needs were repeatedly evaluated. Based on the results, software analysis, design and implementation were purchased via the public procurement procedure. The software development project was carried out as a unified process that was followed up by both the contractor and the supplier.

The evaluation of results was performed mainly internally, first of all by the ELB's managerial staff but also on the Ministry level on the basis of corresponding reports and statistics. In order to improve quality management, the results were constantly evaluated also by Project and Theme Managers. The analysis was made of what could have been done better and in which way, and lessons were learned from the experience obtained.

7) Results indicating the success

The best indicator to measure the results of development and implementation of CIS was the shortening of time needed for registering parcels in the cadastre which decreased several times.

The best measurable indicator of the importance of web-based public map applications is the intensity of use. During the years the average load per month of the LIS servers has been as follows:

2002: 2.7 million hits/month, downloaded data volume 32 GB/month;
2003: 10 million hits/month, downloaded data volume 97 GB/month;
2004: 20.7 million hits/month, downloaded data volume 207 GB/month;
2005: 38 million hits/month, downloaded data volume 440 GB/month;
2006 (March): 47 million hits/month, downloaded data volume 546 GB/month.

During peak hours the servers sustain more than 230 000 hits per hour and more than 24 GB of data is downloaded in one day. These figures are the result of the growing awareness of users, wider use of the Internet as well as continuously added data and functionalities to the service. These figures are very high taking into account that the population of Estonia is only 1.4 million people.

The best indicator for evaluating the provision of free tools for spatial data management for public sector organizations is the number of public sector bodies being in co-operation with ELB, and there is also a trend that co-operation is evolving and becoming more and more deeper.

To improve the case further, we have learned that we must be more active to get in-depth feedback from the users.

8) The main obstacles of the case

It is a field that required both from the contractor and the partners a very good knowledge of geographical information systems. At the beginning of the project the teams of both parties had little experience in contracting, building up and implementing geographical information systems. However, both parties were able to develop and obtained valuable experience in the course of the work done. The co-operation of ELB with other public sector bodies also indicated that the awareness of our society in the field of cartography and GIS is not so good. It can be raised by constant information and publicity measures.

The implementation of CIS at county cadastral offices required a lot of training and due to the automatic control of work processes the employees felt that their freedom of operation was limited. The implementation of CIS enabled the ELB management to get very accurate information on the quality and amount of work performed by every employee and the workloads at county cadastral offices. Based on that, sometimes such decisions were made that were not very popular among the employees.

9) Main sources of inspiration behind the case

The Phare project consultants and key persons behind the LIS development at ELB had definitely a good overview of what had been done and what was going on in Europe in the field of development of land information systems. But because of the fact that our approach was quite innovative (no use of studying) and the environment was rather unique (the land reform, many registers to cope with were under revision, the legislative base and framework were under construction, etc) it was really hard to use the others

experience. Therefore, there are not any specific best practice cases to be mentioned that can serve as the main sources of inspiration and ideas.

10) The most important lesson learned

Innovative, professional and capable persons are the key to success and they are the most valuable asset and hardest to get.