What Challenges You Face When Taking in Use a Wide LIS System?

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Key words: Cadastre, Cadastral index map, LIS, Trainings, Loading the data

SUMMARY

Over the years 2001-2005, a single continuous database has been developed in Finland that includes a nationwide cadastre and a numerical cadastral index map as part of the Land Information System (LIS). The work was done in close co-operation with the National Land Survey of Finland (NLS), the Ministry of Justice and 86 municipalities which formerly maintained their own cadastres. It was a major challenge to link all the existing data transferred from altered applications.

Because of the size of the project, a separate project was set up in 2002 to arrange the launching operation for the new system. It took over 50 man-years for everything to be completed on time. Above all, trying to find consensus among the participants was a very challenging task. The biggest responsibility in the project was to operate the test loadings and actual loadings of all the data transferred from the altered applications in the NLS and in the municipalities. There were heavy training sessions to ensure that those who maintain the data at the NLS and in the municipalities became familiar with the new systems. It was also important to introduce the system to the users of information services. Instructions of all kinds and maintenance rules for users were needed and the project was responsible for preparing these as well. The project also organized continuous support services for all users.

This presentation describes experiences from the project, what was learned during the project and what was successful.

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1. BACKGROUND

There was already an LIS system in Finland which worked pretty well. The LIS is one of the base registers in Finland. The LIS includes the cadastre and the Land Register. The cadastre holds data on all independent units, i.e. real estates. The Land Register contains data on the ownership of real estates (titles) and any mortgages and encumbrances that burden the real estates. Formerly 86 municipalities maintained their own separate cadastres on their urban areas (town plan areas), which means about 2% of Finnish territory. The cadastre for rural areas was maintained by the NLS. (In Finland there are over 400 municipalities but only 86 of them kept their own cadastres on their urban areas and the cadastre for other parts of Finland was maintained by the NLS.) These 87 bodies used to copy their updating data to the old LIS at appropriate intervals. The Land Register is maintained by the Ministry of Justice which also copied its updating data to the old LIS. This co-operation was based on agreements between the participants.

However, the data that came from altered systems was not identical and there was some divergence about updating period. There was also some overlapping between the data and all these factors caused problems. In the old LIS there was no spatial information, i.e. no cadastral index map. Consequently work started on reforming the LIS system. The plan was to have only one nationwide cadastre in Finland in the future. So there is only one database (including attribute data from the cadastre and spatial data from the cadastral index map) that each participant will maintain within its own sphere of competence.

One of the biggest reforms needed was to have a single continuous digital cadastral index map covering the whole of Finland. Because of the new LIS, it is possible to create new products and geographical information services for customers. This will enable efficient and versatile searches of locations. One significant objective was to provide a web-based information service giving easy access to the new nationwide cadastre, cadastral index map and Land Register.

The Land Register has remained outside this reform and the land register will continue in its present state as part of that new system. The Land Register will continue to be maintained alongside the new LIS.

To ensure the commitment of all participants to the new system and to get everything done in time, it was decided to pass an Act, the Act on the Land Information System and Related Information Service (which came into force in 2003) and the Act on changing the act on the cadastre (which came into force on June 1, 2005). The purpose of these Acts was to provide a legal basis for organising a national service covering real estate and other units of land and water areas, based on information technology. The latter Act set the time when the new

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system had to be ready to use. That time limit was very tight and it put extra pressure on the project. The new LIS had to be ready and in use in June 1, 2005. Since that date there has been only one official cadastre and cadastral index map in Finland covering the whole of the country.

The NLS was obliged to set up the new LIS system which includes developing and maintaining the system and the management of financial matters. All this was done in collaboration with municipalities and the Ministry of Justice. At the NLS, the development of the new LIS was arranged by the Development Centre. Because of the size of the project, a separate project was set up in 2002 it to arrange the launch of the new LIS system.

2. THE LAUNCH PROJECT

2.1 Organisation

The main tasks of the project responsible for the launch of the new LIS system were to carry out the loading of the data, issue instructions of all kinds and provide user training on different components of the system. The launch project also produced an information plan for the whole LIS project, established support services and took part in arranging LIS administrative matters. The launch project consisted of a number of sub-projects. Most employees on the sub-projects took part in them part time along with their own professional duties. This caused some problems in timing. At its busiest, there were about 100 employees working on the launch project and it took about 58 man-years to get everything done in time.

Timetable:
The launch project was set up in 2002.
The new LIS was taken into use and started being maintained at the NLS on February 15, 2005.
The new LIS was taken in use and started being maintained in 86 municipalities between February 15, and May 31, 2005.
Other administrative authorities were given access to the browser-based LIS information service on June 1, 2005.
Licensed commercial users were given access to the browser-based LIS information service on October 3, 2005
The service, based on a software interface, was taking into trial use on June 1, 2005 and into production use in February 2006

The launch project was run in close co-operation with the system tools project, and also with some other departments of the NLS, for example the Computer Centre and Sales and Marketing Services. (Tella A: The New Land information System in Finland)

2.1.1   Co-operation with the interest groups

There were three main commissions which organized the project in practice: the launch project, the system tools project and the municipality project. The employees on the launch

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project and the system tools project worked at the NLS. The municipality project was made up of those municipalities which formerly had their own cadastre. The project made it possible to arrive at a common position on demands that were important from the municipalities' point of view. This was essential because there was no prior knowledge at the NLS of the real estate formation or cadastre-keeping procedures used by the municipalities in their urban areas. There was an LIS advisory council which was the supreme authority for the project. A steering committee was set up to control the interest between the NLS and the municipalities. Furthermore, the NLS had its own management group which controlled the internal project work at the NLS.

2.1.2 Administrative matters

The NLS was responsible for organizing the administrative matters for the LIS. There were two separate departments at the NLS which organized these matters and from time to time there was some confusion about spheres of responsibility. There was also an advisory committee consisting of members of the NLS and the municipalities. The committee's duty was to decide on sensitive issues between the participants, such as how to share the earnings from the LIS information services between the participants, what kind of payments there should be, who has to pay for the information and who has permission to assign the information to customers. This 'arm-wrestling' was well worth it and eventually unity was achieved.

2.2 Loading the data into the LIS database

2.2.1 Groundwork

Loading the data from altered applications into one single database was the most challenging task in the launch project. There was 87 different databases and practices for maintaining the cadastre and the cadastral index map. It was known in advance that there were differences between the qualities and completeness of the data.

First, the project sent out a questionnaire about cadastre data quality that included attribute and spatial data quality stored by the participating municipalities. The intention was to collect exact information about the data, what kind of data had been stored and what kind of methods were used for storing the data. However, this was not successful because only 60% of the municipalities answered the questionnaire even after a reminder.

Second, the project decided to visit all the 86 participating municipalities a major task. With help of district survey offices, all the visits were made, a presentation was given about the project, and the information that was needed was collected. It was a very successful operation and many of the municipalities realized that they had plenty to do as well. They were very grateful for the visits and said that, for them, it was the first concrete contact with the new LIS system.

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It was noticed that some municipalities did not have a complete digital cadastre index map and there were also breaks in the data such as broken areas or missing register numbers in some parcels (every parcel has to have an id number). Many of the register-keeping municipalities kept a cadastre index map of a wider area than just the town plan area. It was known that the cadastres of the municipalities were more accurate than the cadastre of the NLS and because of that, the participating municipalities and certain district survey offices made their own agreements about the size of the area that was to be downloaded from the municipality database to the LIS system. If that area was bigger than their urban cadastre area a closer analysis of the data quality had to be made in collaboration with the two participants. The project also tried to help those participants who did not have a digital cadastral index map covering their urban areas.

There was also a third party to add confusion —the municipalities' system suppliers. There are six suppliers of digital cadastre index maps and four of cadastre systems. They had to make the changes required by the new LIS to their own system configurations. Some of those suppliers could not do this, which made it harder for the participating communities to improve on their own data themselves.

2.2.2   Test loadings

Because of the variety of data quality and to ensure smooth production loadings, it was decided to carry out a test loading of data from all the municipalities. The whole data loading operation was run by the launch project. The most of resources for loading were provided by one of the district survey offices. Co-operation between the project and the district survey office was very flexible, which ensured optimum loading conditions. During pauses in loading, the loaders worked in the district survey office and when it was time to load full time they worked only on the launch project.

To start with, there were difficulties in the expert knowledge of the loaders and in a loading application. By test loading it was possible to improve the loading application during testing. The test loading was also a good practice for the loaders.

A remarkable set of systematic errors was found in the cadastre data. Before the actual loading some corrections had to be made to the application to prevent these errors from reoccurring. Cadastre data were loaded one municipality at a time from the old LIS system. There were many faults and the necessary improvements were made by the relevant municipality (or the NLS).

The quality of the cadastral index map data varied a good deal between the participating municipalities. Typical errors in the data included blocks without cadastre codes, boundaries that were not closed or that the loading area was different from what was expected.

The test loading turned out to be a very important and successful phase for the success of the whole project. After the test loadings it was possible to spot the faults in the data and repair them. The project sent a list of faults to the appropriate municipality which made the

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corrections in their data and made them well. All the data were loaded on the same width as the actual loading.

2.2.3 Actual production loadings

First, the data from the NLS database was loaded into the new LIS database and then it was time to load the data coming from the municipalities.

The actual production loading went more quickly than was expected. Speed was very important because it was forbidden to update the cadastre on that loading area while loading. All participants have been appreciative of the speed of loading. The data was easier to load because, after the corrections made by the municipalities, the data were more harmonious. Still, there was plenty to do during loading especially when loading cadastral index map data.

When loading the index map data from the municipalities, the existing data (the data generated from the NLS) first had to be removed from that loading area and then the new loading data inserted. The loaders had to go through the whole of the loading area (one municipality at a time) boundary mark by boundary mark. The loaded data was then checked programmatically.

The cadastre data were loaded one municipality at a time from the old LIS system. Because of defective data transmission technology and data recording practices, lots of erroneous information remained in the old LIS. Even after correcting the data, some erroneous data might have been left in the old LIS and thus also in the new LIS system.

Three employees loaded the cadastre data and 11 employees loaded the cadastral index map data. The loading was made one municipality at a time. The average time for loading the cadastre data of one municipality was 1.3 working days and for the cadastre index map data it was about 9.3 working days. The other jobs that had to be done on the relevant loading area took about 3.5 working days per municipality. So, altogether it took about 13.8 working days per municipality, i.e. a little less than three weeks.

The loading application and the register-keeping application were made by the NLS (Tella A: The New Land information System in Finland). After the data were loaded from a municipality and stored in the new LIS maintenance database, the municipality started to update its data using the new register-keeping application in the new LIS on a regular basis.

2.3 Familiarization with the new LIS

2.3.1 Training

In the launch project a scheduled plan was made for training purposes. Because of the wide range of training and trainees, the project arranged these with four main trainees and 26 specified trainers. The specified trainers came from distinct survey offices and their responsibilities were to train the users in their region to make them familiar with the new

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register-keeping application. The first part of the training was to school the specified trainers to make them familiar with the training subjects. This happened with the help of the four main trainers.

The training especially those for the register-keepers, was very broad-based and the tightness of the timetable placed great demands on planning the training. Training has to be carried out following the loading schedule.

It was decided to centralize all the training materials for the four main trainers. This way the launch project could ensure that every training session would be equal although there were different trainers. It also helped the trainers' work when they received ready material, because the time schedule was so demanding. On the other hand, this increased demand for the training material. The material had to be so logical that the trainers could use it with complete confidence. For the trainees, all the material had been put on the website where they could find it for the training sessions.

The new register-keeping application was completely new to the users in the participating municipalities. In the municipalities, they previously had separate systems for the cadastre and the cadastral index map. Now the cadastre and the cadastral index map are integrated and maintenance is synchronic. Furthermore, there were different practices for maintaining the cadastre and the cadastral index map and different titles may have been used for the same function. There were fairly large variations in the skills of register-keepers from different municipalities. Along with the training for the register-keeping application, there was also training about content. The NLS users are fairly familiar with the new register-keeping application because it is based on the earlier NLS register-keeping application.

After every training session the trainees received a feedback questionnaire via e-mail. The feedback received was very important for the launch project as it could be used to arrange new training when necessary.

There were many other target groups that had to receive training as well. These were other municipalities apart from the 86 register-keepers, other administrative authorities and commercial users. They are not the maintaining users of the LIS and do not have the register-keeping application. They have received training for using the online information service application, which is available to those groups by agreement.

Altogether, the NLS arranged 123 separate training sessions that took 254 training days. There were about 43 participants in each session. Along with those sessions there have been visits to every participating municipality and many specific local meetings. There were also 20 sessions for the specified trainers and 20 sessions for the commercial users. So all of this took about 250 sessions with one session taking one to five days. Every participating municipality was given about 15 days of training.

In general, all the training was successful, especially the training sessions for the register-keepers. There were many target groups and if something could have been done better it

should have been made into a specific course package for every target group. Now, because of the lack of time, all training about the online information service was done using almost the same content in all target groups.

2.3.2   Instructions

The instructions have been drawn up at different stages of the LIS project and were intended to be temporary and only for use during the project. The launch project also prepared some instructions that will remain in place after the launch of the LIS system.

Instructions at different stages of the project were important because there were many participants and it might have been impossible to keep to the timetable without the instructions. Process instructions of all kinds were essential for the well-organized progress of the project. The instructions for participating municipalities showed them how to revise their attribute and spatial data before the loading operation. The loaders needed the instructions to prepare the loading, since even if they were familiar with handling that kind of data; the loading application was still new to them. There were instructions for the code system and a description of the XML schema used when transferring and loading the data.

The instructions that remain after the LIS system has been taking into use included the instruction manual for the register-keeping application and the service applications. The manual for the register-keeping application was essential because the application was completely new to the users in the municipalities.

The rules for maintaining the common cadastre and the cadastral index map are of primary importance. The aim of the common rules was to define the responsibilities for register keeping between the NLS and the participating municipalities. They defined policies on how to operate in the new LIS system environment and what is permitted in neighbouring register-keeping areas and what is forbidden.

It is fairly common that some register-keeping municipalities purchase services from the district survey offices. Consequently, launch project agreement models were drawn up for collaboration on register keeping between the municipality and the district survey office. These agreement models have been very useful when building local co-operation on register-keeping.

Still there is one important distinction in Finland, two official languages, which means that every instruction has to be given in both languages, Finnish and Swedish. This resulted in a massive translation operation during the launch project, much of it unplanned extra work. Most of the training materials had to be translated as well.

2.3.3   Organizing the support service

At the NLS a support service has been partly reorganized because of the new LIS. There is a centralized helpdesk that will be on call in working hours. It was decided that the helpdesk

would be split into the four different sections to clarify support for users. There are now support services for the users of the register-keeping application, for the users of the information services, customer support and internal ADP support for NLS employees. Customer support is a new section that was set up to handle the user application forms and to support customers with administrative matters.

The helpdesk has received excellent feedback from the register-keeping municipalities and from other customers. Nevertheless, there is one further challenge which is how to handle requests for support with workstations and other ADP issues that come from outside the NLS. These are not LIS support services issues apart from the register-keeping application. However, there has been much discussion about how much support can be given on certain issues.

2.3.4   Communication

A specific plan has been made to inform different parties about the LIS project and detailed information plans have been made every year during the project. Issuing information bulletins was less effective than anticipated. All the different meetings organized during the project were a more effective way of communication. The best results were obtained when someone from the project visited the participating municipalities.

Nevertheless there have been many different methods of communication, such as presentations at all kinds of events and professional meetings, visiting the participating municipalities, announcements in every quarter of the year, other information when needed, exhibition stands, handouts (for the different stages of the LIS project), the LIS project website and the permanent website of the new LIS, meetings between interest groups (every other month), e-mails to target groups, training and information events arranged with the system suppliers of the municipalities' cadastre and cadastral index map.

There are many target groups for the new LIS but the information was focused on the register-keeping municipalities. Wider information for commercial users started at the end of 2005 after the launch and after the LIS project had ended. Was that too limited? During the LIS project, information style and breadth were discussed at length. However, the launch project took the view that the information issued primarily for the target groups was adequate.

Certain messages were prepared but these could not be utilized. Consequently, the same things were written about too often, which was a waste of time.

3.   AFTER THE LAUNCH

The first year after taking the new LIS system into use is proceeding well.

The browser-based LIS information service was taken into use gradually. The register-keeping municipalities started using this html web application at the same time as they started

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to maintain the new LIS system, immediately their cadastre and cadastral index map data were loaded into the new LIS database. Commercial users did not have the right to use the browser-based LIS information service until autumn 2005. This gradual adoption of the service was done to ensure the usability of the application.

The register-keeping application was completely new to the register-keeping municipalities as were the methods for maintaining the cadastre and cadastral index map. At first there may have been a little timidity in using the new register-keeping application. After all, the register-keeping application has fulfilled the needs of the municipalities, even if there are still some municipalities whose own links between the new LIS and their own systems and working processes are still in the transitional stage.

To start with, there was considerable pressure on the support services especially on the support service for the register keepers. Specified trainers who had given training sessions helped the support services at first. This expanded support continued until late autumn in 2005. Because of questionnaires and feedback the support services were operated extremely well. They have been praised for being speedy and professional. Now, one year on, practising users have learned to use the new system and the need for support and training has been gradually reduced.

On the basis of registration statistics, the volume of register keeping returned to its normal level at the NLS within two months of loading.

When it was agreed between a certain district survey office and a certain municipality that the width of the loading area of the municipality was larger than their urban area, it was perceived in some places that the extra area of the data from the municipality was of poorer quality and less up-to-date than was expected. If the district survey office made a parcelling procedure somewhere in the area just before loading it might disappear from the database without leaving a trace. Errors of this kind have caused extra work after the new LIS was taken into use.

Some additional loadings were made when it has noticed that modification of the coordinates from the municipality's system to LIS coordinates was erroneous or when some spatial or attribute data was defective. Defects in spatial data were caused by errors in the municipality's XML/GML transfer structure so that a certain data item acquired a wrong meaning.

Nowadays, about 600 NLS employees and about 400 municipal employees use the register-keeping application. In the browser-based LIS information service there are some 450 chargeable users and some 4000 users who can use the application free of charge. Furthermore, there are some administrative groups (the other municipalities — about 320 of them, federations of municipalities, Regional Environment Centres, Environment Permit Authorities, Forestry Centres and State Provincial Offices) that are allowed to use the LIS information service free of charge. Companies that need the cadastre information because of business will be given the right to use the browser-based LIS information service by

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application. These companies include banks, estate agents and attesting notaries and they are chargeable users.

The LIS project has received great acclaim. The register-keeping communities have praised the LIS project for the firm commitment of its employees and especially the project managers to the project work and progress. Collaboration between the register-keeping municipalities and the district survey offices has become still closer.

The browser-based LIS information service has been a very successful service for users because it is easy and clear to use and the cadastral index map included in the service speeds up data searches considerably. Now, it is possible to search for data from the cadastre, the cadastral index map and the Land Register in the same browser-based service. There are also some other data services available from the LIS. (Tarvainen T., Myllymäki T: Joint Use of Geographic Information – Cadastral Data, General and Topographic Map Data)

The new LIS system will continue to be developed after the launch. New maintenance teams were set up in the NLS to maintain the system at the beginning of 2006. They will take care of correcting errors in the data and applications and launching new versions of the application and further developing the LIS system. Continuing collaboration between the participants is essential for further development. During the first year there has been a focus on the protection of usability. A number of tracking and control tools for protecting the usability of the system have been developed with a focus on sharing expert knowledge between employees and finalizing the documentation of the LIS system.

4. CONCLUSION

Co-operation between many different partners was extremely rewarding. Everyone had to do their best and compromises had to be made when needed. The launch project managed to arrange and schedule loading, training and instructions and ensure their compatibility. It was only possible to take a wide system like this into use because of these efforts. The first year after taking the new LIS into use has proved that as a whole this was an excellent reform. People learned how to use the new LIS system and good co-operation between the participants will continue in the future. The new LIS system has standardized the cadastre and cadastral index map quality and updates and the browser-based LIS information service has relieved the work of many customers.

In the future, the new LIS system will continue to be developed. In the near future there will be projects such as the overhaul of the Land Register and the implementation of the National Information System of the Land Use Planning Data that will be integrated with the new LIS.

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BIOGRAPHICAL NOTES

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