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Ireland Leaps Ahead with Land-Registration Records

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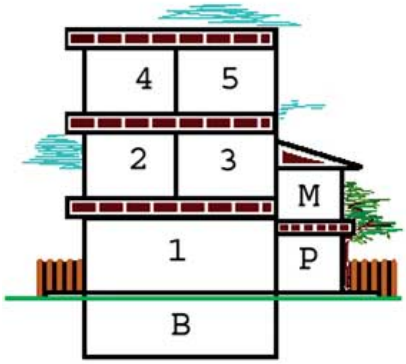
When Ireland's Property Registration Authority (PRA) appointed a consortium comprising RMSI, Landmark Information Group, Proteus Solutions and Paper Dock to help convert 32,000 paper map sheets into electronic format, it wasn't just moving, in cadastral terms, from the 19th to the 21st century; the modernization effected title laws established more than 1,000 years ago by St. Patrick himself.

St. Patrick's immense influence on Ireland included Cain Patrick (i.e., Patrick's Law), which laid out the land-tenure system of ancient Ireland that was based on, believe it or not, the cow. Land tenure then was viewed in relation to capital, and not on the land itself.

A tribal chief, for example, would lend livestock to a tenant. The tenant then had the right to occupy land for the agreement's period of time. In return for the livestock, the landlord/chief received an annual return from the stock.

Historically, land was registered as a written document only. The government would keep a descriptive book in which all the grants were recorded. In this example, a particular piece of land was given to Mr. X. At the same time, a descriptive certificate would be handed to him. If Mr. X sold that land to Mr. Y, then he would have transferred the certificate to Mr. Y.

But, if the sale was only part of the land, then the transaction could have been verbal. This is known as the conveyance system. But because of its descriptive nature, the land boundaries weren't always clear.



Adding 3-D data supports modern land-registration complexity. Due to the vertical growth of cities with multi-storied buildings, several types of land tenures may coexist in a single piece of land (B = Basement, 1 = Ground Floor, P = Parking, M = Mezzanine Floor).

Through the centuries, cadastral systems slowly modernized. In 1708, the Irish Registry of Deeds was formed to provide a system for recording the existence of deeds and conveyances affecting land.

Although the deeds were recorded, no examination of their legal content was undertaken, and there was no process to identify deeds by reference to a map. The Registry of Deeds gave legal priority to deeds that were registered over unrecorded deeds or deeds recorded later in time.

Registration of a Title System

The Land Registry was established in 1892 to provide a title-registration system underpinned by a state guarantee. Ireland's system of title registration is largely modeled on the Torrens System of registration: the registration of titles and documents as supported by large-scale maps.

Land Registry adopts the non-conclusive boundary system to determine a parcel boundary on large-scale maps, which "does not indicate whether a title boundary includes a hedge or a wall and ditch or runs along the centre of a wall or fence or its inner or outer face or how far it runs within or without it."

Instead, Land Registration Rules and Practice Directions demand that such details should be maintained accurately in the detailed application map prepared for each piece of land to be registered.

Land Registration in Ireland

On Nov. 4, 2006, the PRA became the federal organization responsible for registering property transactions in Ireland. Its main responsibility involves examining and assessing the legal effects of various title deeds, certificates, maps, statutory declarations and other documents, which are submitted as applications for changing or updating the register.

Seed points are the mechanism through which individual land ownerships are linked to the corresponding folio / register.

Although the registration system has, for some time, been recognized as excellent, the delivery of its services in a paper-based environment in today's increasingly electronic economy was a problem. In response to various government initiatives, business imperatives and customer demand, the PRA developed strategies to address these challenges.

The organization had conducted a review of its systems and processes in 1990, and some progress was made in modernization, thanks to catalysts for change such as the Irish government's Strategic Management Initiative, Information Society Action Plan and National e-Government Program. But these programs, demanding faster and better service through electronic media, meant PRA faced fundamental changes.

Early Initiatives

Beginning in the mid-1980s, limited computerization to the Land Registry system was undertaken. Most of this progress had been made with the textual part of the folios for one county and, to a smaller respect, in several other counties. A significant system review was undertaken in 1990, and work commenced in the mid-1990s on new, computerized registration for the title system.

A customized interface for parcel capture uses Ordnance Survey Ireland digital vector data.

In July 1999, the Irish Land Registry introduced the Integrated Title Registration Information System (ITRIS), under which the folio-related data available in a paper environment were converted to an electronic storage and retrieval system. This system also had a facility for case management and provided direct support for application processing.

Along with ITRIS, the Land Registry introduced the Web-enabled Electronic-Access Service (EAS) to deliver information online to customers. A major challenge was converting historical paper records (textual and map records) created since 1892 into electronic format. To address this, a Document-Imaging System was developed and integrated into ITRIS.

Thereafter, some 6.4 million pages of records and maps were imaged during a three-year period from 2002 to 2004. As a result, all the folios and individual-filed plans for each parcel could, for the first time, be provided to customers electronically through EAS. However, the raster folio maps didn't provide elaborative spatial data in respect to a particular piece of land, and relationships with neighboring land were absent.

Digital Mapping Project

To deliver true spatial data through the Internet to PRA customers, the first step was to convert the existing paper maps to digital format and allow updates of this information. With this objective, the Digital Mapping Project was launched on June 20, 2005. The project involved two contracts:

- Contract No. 1 relates to the supply of the technology (equipment and software) that will underpin the Digital Mapping System, together with the services required to develop and implement the solution. This contract was awarded to a consortium headed by 1Spatial that includes Proteus Solutions, Version 1 Software and IME UK Ltd.

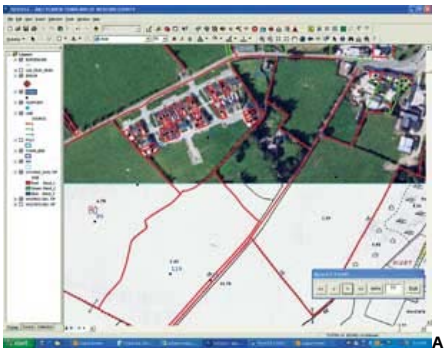
- Contract No. 2 relates to the project's data conversion aspects and spans more than five years. It involves placing special geographical locators (i.e., "seed points") on the 2.4 million or so parcels of registered land across the country, followed by the systematic digitization of the parcel boundaries. This contract is being executed by a consortium headed by Landmark Information Group. Within the consortium, the project's data capture aspect is being undertaken by RMSI. The consortium also includes Proteus Solutions and Paper Dock.

The link between the two contracts was established through an Oracle 9i spatial data model (DAS4 Data Model), which also supports modern land-registration complexity such as 3-D data (due to vertical growth) involving multi-storied buildings as well as where several types of land tenures may coexist in a single piece of land.

The First Phase

RMSI dedicated more than 150 of its staff to capture seed points in the first phase of Contract 2, advancing forward in a county-by-county schedule. Seed points are the mechanism through which individual land ownerships are

linked to the corresponding folio/register. For this, RMSI geo-rectified all the paper maps with the help of large-scale vector data provided by Ordnance Survey of Ireland (OSi), Ireland's national mapping agency.



A quality-check process to ensure parcel completeness uses multiple sources, including land-registry maps and orthophotos.

With the help of OSi vector data, RMSI brought all the maps into a common coordinate reference system: Irish Transverse Mercator. Now modern surveying techniques, such as Global Positioning System technology, can be effectively incorporated in the new land-registration environment, which brings Ireland inline with best international practices and standards.

Linking seed points with the GeoDirectory address database, a product jointly created by OSi and An Post, the Irish Post Office, facilitated the search of specific addresses by Land Registry customers. In this phase, RMSI also reconciled any discrepancies among OSi administrative boundary data and corresponding data already contained in the ITRIS database, where, for example, names used for the same townlands weren't always identical.

Folio capturing was done via a customized application before the start of actual seed pointing for every county. Thus, at the time of seed pointing, the points within each townland were automatically linked to the corresponding folios. Nevertheless, following this exercise, some queries remained (e.g., seed points without corresponding folios, folios without seed points, etc.), which were sorted out by the onsite team based in Dublin and working in close connection with the Land Registry's own staff.

In a period spanning more than six months, RMSI completed seed pointing of 2.4 million parcels, covering approximately 6.9 million hectares. These seed points also were used by RMSI during Phase 2 of the project. At this stage, RMSI received updated scans of the paper maps, because new registrations had taken place between Phase 1 and Phase 2.

To make the data error free, RMSI runs various logical checks complemented by manual intervention at the entry and exit points of the workflow system. Logical checks also are built in the system to avoid generating new errors within any of the subsystems or during transition stages.

The Second Phase

Phase 2 deals with capturing the boundaries for each registered parcel on a county-by-county basis (which is aligned to OSi's own map-update program), and it uses OSi orthophotos to create links among the OSi feature ID and the Land Registry Boundary where they coincide. Such linkage is expected to help automate future map-maintenance processes.

One of the project's most interesting aspects was the creation of "imagettes," which are parts of map images that don't match with the area's overall land features. They're portions of a map that are cut and locally transformed to store as a type of "metadata" evidence of why a particular boundary was digitized in a particular way.

Management Aspects and Future Plans

RMSI developed two online systems to facilitate better project management and query resolution: 1) a Query-Management System and 2) a Project-Monitoring System, using JSP, MapViewer (Oracle 10g) and Internet Explorer. These two systems helped all concerned parties raise queries, receive solutions and monitor the project's real-time progress.

For internal project management, various types of reporting systems were developed, such as resource utilization, idle time, quality feedback, etc.

The Land Registry made the seed-point data available to customers through the new Landdirect.ie Web portal, which went live on April 28, 2006. Ireland became a member of the European Land Information Service (EULIS) on Nov. 21, 2006, and the digital map will be a key service enabler for EULIS customers. Indeed, Ireland couldn't have been a functional member of EULIS without PRA's ambitious modernization programs.

On Nov. 23, 2006, the project won the AGI Award for Innovation and Best Practice. Shortly thereafter, the digitized parcels for the first county (Longford) went live, and the first changes to the Irish land register using the new digital map base were made at Land Registry headquarters in Dublin.

This represents a major milestone toward fulfilling PRA's overall objective of a nationwide land-registration digital mapping system by 2010. The Digital Mapping project also was nominated for the Public Sector Times' Irish eGovernment Award for 2007 under the State Body category.