

during both project phases.

V1: Given the legal framework of land parcels, precision is of the utmost importance. What steps were taken to ensure that the accuracy of land property boundaries were precise?

Karandikar: Apart from stringent internal quality controls, there were three fundamental processes used to ensure accuracy of boundaries. All of these were developed in conjunction with key client staff members from the Property Registration Authority.

The first was the creation of a formal Data Capture Management Plan (DCMP) and a Digitization Protocol. This helped set benchmarks and quality acceptance criteria required under the PRA's property registration guidelines.

Second, a strict 'Proof of Process' was used to test and validate the DCMP and Digitization Protocol. A representative sample of test data was digitized during the proof of process using the DCMP guidelines.

Thirdly, the final output datasets created by RMSI were subjected to quality checks via the Data Acceptance System (DAS) built independently under the system development contract for the Digital Mapping System.

Only after ensuring the above processes were successfully tested, was any bulk digitization work undertaken. In addition, PRA- staff and RMSI team worked in partnership regularly in each other's offices at Noida (India) and Dublin (Ireland) to ensure consistency and accuracy throughout the project duration.

V1: What role did web-based systems play in your collaboration with PRA on this project, and the delivery of information to citizens?

Karandikar: Web based systems played a critical role in this project in collaborating with PRAI during project execution. These primarily included:

Query Management Portal (QMP) - Most clarifications related to data capture were carried out through a secure online QMP. The web-site was developed to allow users from data capture team to raise queries to the client. Queries could be logged into this system, which, after internal validation, automatically sent an email to the client's query resolution team members, so that they respond to the queries raised. It provided quick resolution of queries and served as an archive for earlier clarifications.

Online Project Monitoring System (PMS) - A secure in-house developed online project monitoring system was developed to monitor day to day progress of the project. This was linked with the production databases to get real-time information. The progress could be viewed in the thematic maps for each county in Ireland and also for the complete country showing different stages of the data capture activities in different colors. This portal can be accessed securely over the internet, and provided client an opportunity to see real-time progress under different activities of the project.

Further, the web site www.landdirect.ie is the medium of delivering information to professional users and citizens. This portal now includes access to advanced Digital Mapping facilities, through which the data created by RMSI under this contract is displayed and used.

V1: What were some of the technical challenges that you faced? Were there any innovations in terms of the technology that you applied or the approach that you took?

Karandikar: We faced challenges in three critical areas during the execution of this project. These were (a) project sizing (b) handling regional nuances in data, and (c) managing business as usual for the client.

The project sizing phase (Phase 1) was to be completed in a six month timeframe. Hence, the challenge was to quickly mobilize a 150 person team, trained to optimum productivity levels, in parallel to ongoing project setup activities. We used an internal productized project execution framework to rapidly deploy, familiarize and train them on the digitization protocol being developed and deliver Phase 1 of the project successfully.

To handle regional nuances, our process development team continuously added new business rules to integrate such nuances into our digitization workflow systems. For example, in Dublin, one finds many instances of row houses where vector data does not explicitly show boundaries between semi-detached houses. Business rules were created to handle such cases and process automation techniques built to enforce quality.

To manage Business as Usual (BAU) for the PRA, a BAU framework was created within the data capture environment. This facilitated PRAI to continue to accept property registration/transfer requests during the period when a county was 'frozen' for digitization, and send them to RMSI just-in-time for integration into the final database for the county. Hence, the final digital data for each county was always the most up-to-date reflection of all finalized and in-process registered land parcel boundaries.

V1: How does this project fit into the broader context of the European Land Information System (EULIS)?

Karandikar: The Digital Mapping Project offers an on-line access to land and property information for more than 87 percent of all land titles in Ireland, covering over 93% of the land mass of the State. With the success of this project, PRA now offers a fully electronic national register of properties, held in one of the largest transactional databases in Ireland. What is now available to subscribers in their online service landdirect.ie is at par with the "best in class" internationally. With more than 10,000 map services being availed each day this service is clearly a success. The information is available to national customers through www.landdirect.ie and to customers in certain other European countries through the European Land Information Service (www.eulis.eu). Prior to the development of this ICT infrastructure all of PRA's map services were delivered manually in a paper environment and participation in EULIS would not have been possible. Today almost everything is delivered electronically with no delays involved.

The project has been acclaimed as a success story globally and has won multiple awards in the recent past. More importantly, this project positions the PRA at the forefront in implementation of land registration, and has created a unique resource for the nation to benefit from.

V1: What are some of the social and economic benefits that will be realized by creating such an accessible land registry system?

Krandikar: Socially this land registry system would create an up to date and clear depiction of property ownership and tenancy of the nation. In Ireland, registration of land carries a State guarantee. For the Irish economy, a fully digitized land registration system increases the accessibility and value of land related information as a basis for evidence-based policy formulation. For developing countries in particular, true and accurate information of property also contributes to socio-economic development and leads to development of micro-finance and micro insurance sectors, amongst others.

V1: I understand that a land registry scheme that is based on the UK model has been proposed in India. Is this work progressing, and what benefits might be realized?

Krandikar: India is implementing an ambitious National Land Records Modernization Program (NLRMP). This centrally funded program is an initiative to develop a modern, comprehensive and transparent land records management system with the aim of implementing a conclusive land-titling system with title guarantee - a single window to handle land cadastral records.

All components and activities under NLRMP are being taken up in a systematic, two phased manner - Phase -1 covers activities for reaching the stage of conclusive title, and Phase -2 covers archival purposes and strengthening of the revenue administration. Major components of the program include computerization of land records, survey and settlement records, computerization of registration, computerization of registrar offices, core GIS (village index base maps), and capacity building and training. Work is progressing on a positive note and many states have started implementing this program.

V1: Given the expertise that you gained on this project have other opportunities in land parcel registration presented themselves?

Karandikar: Yes. In India, we are executing a considerable number of projects under the NLRMP program for state government agencies. Internationally too, we continue to pursue the land information management domain aggressively via existing contracts and new opportunities. These include projects related to cadastre, development of land/cadastre information systems, and GIS based field surveys, amongst others. There are quite a few opportunities that are in advanced stages of procurement.

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