Ain Shams University
Faculty of Engineering
Public Works Department

Evaluating the Use of Modern Technologies and Techniques to Improve Existing Cadastre System in Egypt

BY

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M.SC. Civil Engineering
Ain Shams University
Cairo, Egypt, (2001)

A Thesis Submitted in Partial Fulfillment for the Requirement of the
Degree of Doctor of philosophy in Civil Engineering
(Public Works Department - Surveying)

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Approval Sheet

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STATEMENT

The dissertation is submitted to Ain Shams University for the Degree of Doctor of philosophy in Civil Engineering (Public Works Department - Surveying)

The work included in this thesis was carried out by the author in the Department of Public Works, Faculty of Engineering, Ain Shams University from December 2001 to July 2005.

No part of this thesis has been submitted for a degree of a qualification of any other University Institution.

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ABSTRACT

Cadastre systems which are a subset of spatial information systems, aim at identifying and maintaining legal boundaries of properties, also provide information related to nature, size, and ownership of land use and elements. The fundamental structure for collecting, storing, and retrieving information in cadastre systems is the cadastral parcel.

It will not be possible to design a global cadastral system suitable for any case and all circumstances. This is true specially when considering the socio-economic basic conditions, which are different from country to country. The different forms of land tenure and the legal situation in this field give the framework for cadastral systems, and how to carry out its technical features.

The present form of cadastral system in Egypt, usually suffers some deficiencies such as the limiting capabilities for providing data, database updating; the very slow rate, with a lot of routine in carrying out the cadastral functions, tasks, and their costs. So, considerable time is needed in order to access, locate, retrieve and update the information that stored in traditional forms of cadastre system database, as well as, the data-updating process is so difficult. In addition, like most developing countries, the growth of population, and the rapid developments within society, are increasing the demand on urban and rural land, and highlighting the urgent need for current, relevant, and easily accessible information.

The main objective of this thesis is to make optimal use of some modern technologies and techniques of computer, surveying, and

information systems science, to improve the present form of cadastral system in Egypt and develop it towards an automated cadastral information system (CIS), which will be capable of importing, storing, and providing fast accessing, retrieving, handling, and updating of large amounts of data included in this CIS databases, that related to parcels, land-uses, owners and ownership, and other spatial features (buildings, roads, and utilities) with an efficient, easy, and fast ass possible manner, which leads to save the public and private money, time, and effort, as opposed to traditional present form of cadastral system.

Consequently, the following five main sub-objectives were achieved as a work-plan for establishing the sought CIS. So, the cadastral parcel definition were developed to be suitable for our status in Egypt, then, a new main-rules were defined to control the relationship between cadastral-parcel and other spatial-features types (such as: land-uses, buildings, roads, utilities-types), in addition, the concept of Parcel-identifier (Parcel_id) was defined according to the administrative subdivision levels in both rural and urban sectors in Egypt. Also, the spatial and non-spatial data we need to store in our developed CIS database were identified, collected, and imported from different data sources. Then, based on the designed key rules, the CIS-relational database (non-spatial database) were designed and established. After that, the CIS-digital spatial (geographic) database, were built to include all CIS data-layers.

At last, a cadastral software package “CADASTRE-2” for Egyptian cadastral system status, was designed and established based on the built database to be capable of using and implementing those

capabilities of the designed database for achieving most of the cadastral functions and tasks. The main functions and tasks of the developed cadastral information system CIS can be summarized as:

- Access into the CIS relational-database and explore, query, process, retrieve and display its data with an efficient manner.
- Search for different data types by a piece of available information according to the different available spatial features, owners, and ownerships, in order to display the cadastral system database data.
- Creating reports with spatial and non-spatial data related to parcels, land use, utilities, buildings, and apartments.
- Perform all types of updating such as: “Add New”, “Delete”, and “Edit” for attributes-data and/or related owners, ownerships, parcels and other available spatial features as easy, and fast as possible.
- Implement all types of cadastral transaction that are applied on ownerships related to parcels, owners, and all spatial features in the most safe, accurate and automated manner possible.
- The most important transactions are: (ownership transfer (Selling, Buying, gifts …etc), rights changing, subdivision of spatial feature, and merging several spatial features).

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