Technology in Mapping and Managing Land at the Israeli Land Administration

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Key words: Israel land Administration, land management, computerized systems, GIS.

SUMMARY

The Israeli land administration (ILA) or as it initials in Hebrew – mmi, is the government establishment to manage the land of three different owners of the land.
As a management authority this establishment needed targeted tools and system which enable him to control supervise and manage the land in the most efficient way.
During the last 20 years the ILA became more and more technological and relay on computerized systems.
Most of the systems are built for the ILA bases on systems that some of them are available on the market and transformed to the specification of the ILA and some are unique only to the ILA.
Today the computerization system of the ILA is decentralized functionally, and centralized in management.
The whole system in general is on - line system.
Each district is an autonomous unit and his database separate from the other districts databases.
Most of the database feed and update done by the district itself ,in each district there is the same systems and the difference between district to each other define only on the size of database and the amount of the district activity.
This is promise standard and homogeneous activity in all the districts.
The development for the management and districts done mostly at the department of information and control.
In this review I will focus in two main areas of systems the mapping systems and the land management systems.

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1. BACKGROUND

The Israeli land administration (ILA) or as it initials in Hebrew – mmi, is the government establishment to manage the land of three different owners of the land:
1. KKL – The Israel National Fund
2. DP- the development institute
3. State.

Those three owners, own about 92% of 22 million Acers and the rest belong to the private sector.

The ILA established in 1960 based on three laws and one treaty between the state and the KKL.

Since 1960 the ILA have one of the most significant influence on the every day life in Israel, this influence affect the public sector, agriculture, industry etc.

The ILA is subordinate to the council of Israel lands that is the body that according to his procedures the ILA will set big part of activity of the administration.

The ILA is divided to 6 districts and few other national units.

District of the ILA is the smallest independent unit that could execute transactions in land.

Every district compound from a number of departments:
- Department of registering – responsible for the land registry, first settlement of land, and management of the "book of the assets" of the ILA, which is similar to the lands registrar.
- Department of supervision- is the responsible department of guarding and enforcement of the land.
- Department of urban planning- is responsible on planning of the land that in the district level.
- Department of finance – is responsible on the debit ,the collection and system of the budgets manage system.
- Department of judicial consultation.
- Department of valuing of real estate
- Department of urban transactions- deals in varied of transactions start from transactions of dwellings and up to industry, infrastructure transactions etc.
- Department of residents and urban contracts – deals with existing contracts.
- Department of agricultural transactions - deals with respect to the agricultural transactions from pasture, plantation, seasonal growth and dwellings in the rural settlements etc.
- Department of cartography, survey, and GIS (DCS) - is the department that deals in the cartography and in registering of the ground as basis to the other departments of the district also manages the geographic information system (GIS).

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ILA as mentioned above takes a wide part in the every day live in Israel, if by the allotment of grounds to the agriculture (from plantations, pastures etc), fire practice area and camps of army, infrastructures, quarries, dwellings, tourism and all other designated use set by programs describes began from national level and down to the urban / local level.

All these activities named transactions in land, and in order to withdraw them are required processes in the provincial / national level, that defined in the procedures of the ILA.
In order to withdraw such transaction needed collaboration of the entire departments in the district, in a process that until two years ago was a column process.

2. THE COMPUTERIZATION IN THE ILA

Trough many years the ILA manage the land in the old traditional way of using files and archives' system which her benefits with her, though I didn't find any…
The system was based on written documentation in the finance and transaction section, at the mapping section the drafts and mapping preformed on paper maps, the calculation of area preformed by the mapping divisions by using equipment with low accuracy like pantograph which effect the quality and reliability of the transactions.
This data was the basis to the future ILA database.
At the last 20 years the ILA started to work with computerized systems each department reminded above managed her computerized database that in some of them based on different systems.

3. THE SYSTEMS

The systems in the ILA are divided for 4 main groups:
- Land management systems- TFA, the registration system, planning system, supervising system, legal system, and evacuation system.
- Administrative system.
- GIS systems.
- Imaging system.

3.1 The TFA system.

One of the first and most important was the TFA, a system, which her initials come from the divisions who were the system built for:
T- Transactions divisions
F- Finance divisions
A- Archive divisions
The land management systems, TFA, deal with more than 1370000 properties.
This system is a Oracle DBMS / CODASYL based system and the reception of data is based on alphanumeric data.
Most of the everyday actions are made with this system:

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a. **The transaction system**- see "STAR" system, escorts the operative management of land including the process of making the transaction in the district, her approval and producing the contracts and supervision after her implementation.
b. **Finance system**- deals with all the finance aspects.
c. **Lessee system**- deals with all the transaction at the period of the lessee contract: rebuilding, enlarging area, transferring lessee rights, jubilee lessee and more.
d. **Assessment system**- system to evaluate and to outsource assessments.
e. **Tender system**- centralized system deals in preparation of tenders.
f. **Land registration system**- system, which deals in the land inventory under the ILA management and registration of ownership, the system contain, information on about 15000 blocks and 1270000 parcels.
g. **Evacuation system**- system to registration calculation and management in evacuations in land.
h. **Planning system**- system to registration of urban plan programs and lots (more over 67000 programs and approximately 1000000 lots.
i. **Supervision system** – contain reports of the ILA inspectors who inspect the land.
j. **Legal system** – system to look up upon files in legal procedure.
k. **Parcelization system**- system to monitor parcelization actions.

3.2 The imaging system

Another major progress, which took place also about 5 years ago with the entrance of new system for archive, called simply "imaging".
System to manage documents that deals in all the ILA files today contain more than 1000000 scanned files
The benefits of the system are tremendous:
-   ILA workers do not have to deal with files based on memos written on papers
-   Search after a document is by verity of options.
-   Less space is taken.
-   Less lost of documents,
-   More simple way of making copies.
-   Etc.

3.3 The GIS

Global information system -
The DCS have until 10 years ago produce blueprints\drafts by hand and in a graphical way, thing that caused to their reliability to be low relatively as mentioned above, and had no designated system.
As an institute, which deals with lands, the best system is one which combines data with graphic description related to land and the GIS is the answer.
Since the use in the GIS the ability to make blueprints and maps improved significantly, the data of the system became more detailed accurate and enable geographic analysis that assisted the planers to see a wider picture.

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About 10 years ago the Arcview 3.2 was assimilated at the DCS departments and about 5 years ago it was replaced with the Arcview 9.2 with an application which were built for and by the ILA (the division of information and control) and improved continuously.

The GIS at the ILA based on tree levels of layers some of them constant and other are updated one:

- Central layers- layers that are relevant to all the districts such as: cadastre, addresses, streets, etc.
- District layers- relevant to each different district such as: district transaction layers, low ortophoto, declared ancient area, seasonal rent layer, urban plans programs, ownership layer, etc'.
- User's layer- as it called.

This system enables the ILA to analyze, plan, and manage the land in the most efficient way due to continuously updated layers.

The GIS at the ILA was specified to the ILA needs and have is own unique sub systems:

3.3.1. Free lots tracking system

A relatively new system, which built in order to find free available lots:
- Lots who created because change in assignment in urban plan programs.
- Lots, which are left over previous tenders.
- Lot, which are after legal treatment.

3.3.2. Maps archive:

Due to the nature of work at the DCS divisions, over the years a lot of maps, drafts from a verity of types was accumulated at the DCS division.

At the year 1988 one of the DCS managers specified a system, which enabled the DCS workers to archive the maps in varies of descriptions:
- Block and parcel
- Reference to urban plan map.
- City \ region.
- Type.
- Surveyor.
- Etc.

At the year of 2006 myself with the help of my colleges upgraded the system and made her GIS oriented system which enabled us to:
- Preview map on screen related to an area window.
- To attach ILA files number.
- Better search options.
- To save in more accurate originals and projects.
- To view all the versions on one screen with all the related layers relevant to the area window.

The DCS department also use the AutoCAD program to produce draft because her efficiency and it combined with geodetic application who called "pitronim" that complete the lack of cad ability in the ESRI Arcview .

4. THE "STAR" SYSTEM

Process in reception of land transaction

At the previous years transactions in land were made at human combination of verity of system each department in the district uses its own specified system with no interface between those systems.
As a result during the years contradictions had occurred:
- Contradictions between transaction codes- each type of transaction in the ILA has its own code that described it and by nature there is a transaction that **cannot** co-exist on the same area and the human inspection weren't in many cases so efficient such as accommodation transaction with transaction on different purpose.
- Overlap transaction – despite what mentioned above there is transaction that cans co exist on the same area such pasture with fire zone areas.
- Transaction area borders – due to the old way of making drafts and because of their graphic nature in some cases they overlapped.

from all the systems mentioned and the no interface between them there was a gap some department were working on GIS systems which the polygon of transaction is singular and in the other side there was department which worked in alphanumeric system.
In order to solve this conflict the "STAR" system has been born.
This system came in order to solve two major problems:
1. Quality- to solve the problem of lack interface between the systems which effected the quality both transactions and database.
2. Speed- to complete transaction in faster time.

The principles behind the building were:
- Friendly to the user.
- Windows oriented system.
- Interface with other ILA systems.
- Avoiding from duplication in data reception.
- Reception of data by the responsible department.
- And a destination for the future – to work without a file.

The process of making transaction in the previous years was:
- An application was submitted to one of the transactions departments (urban, agriculture, resident).
- The application was identified upon block and parcel and then a draft is made by the DCS department.
- The file is than checked at the urban planning department upon the relative program and the purpose of the relative plot of land.
- Then it goes to the department of supervision.
- To the assessment department.

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- Back to the finance department for vouchers.
- Finely to the submitted department.

This column process was long and not always easy both to the common citizen and for the ILA as public server.

The reason for this process, was the lack of interface between the different systems, and therefore was dependence in each other department.

The solution was to work simultaneously as a star shape process (and that the reason for the name of the system) for the speed and with interface for the accuracy and quality.

At the "STAR" system the DCS is at the center and the moment the application is submitted to the CDS the process begin:
- The submitted department opens a transaction file with the appropriate transaction code and submitted it to the CDS.
- The CDS is checking the block and parcel and make a drift.
- At the process at the CDS the system running checks at the background on other ILA systems as mention above.
- If there is no contradiction the transaction is acclimatized into the geographical database in a singular way.
- The other department can now give their opinion independently from each other and simultaneously.

This system benefits are easy to understand as the combination between two major systems the "STAR" and GIS:
- Direct flow of professional department directly into the database
- Creating an updated transaction at the GIS which correlated the transaction at the TFA system.
- Automated checks at the beginning of the process which flooding the problems and save resources.
- Databases correlated to each other and more accurate such as parcels, lots, transactions, GIS for example: transaction on a lots which is parts of a parcel and not overlapped and complete the full parcel.

5. CONCLUSION

a. These days there is a process to built one centralized system that will replace most of the systems mentioned above.
b. Though the "STAR" system come to solve problems, it suffers from hard birth pains because of various of reasons:
   1. The "STAR" system is complicated because it has combination of deferent systems and departments.
   2. Technophobia- this is new system, which replace system that runs for decades, most of the people do not like changes.
   3. Communication – there is problem between the central database and the district database communication related to the security.
   4. Database reliability – as mentioned above the database of the ILA is not perfect and its affect the process.

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BIOGRAPHICAL NOTES

Gil Vaknin born in 1973, a licensed surveyor (since 2004) and a registered professional engineer (Since 2002). Graduated from Geodetic Engineering division of Technion – Israel Institute of Technology. Worked in a private firm as a surveyor (2002-2005).
Head of Mapping department in Israel Land Administration (2005-2007) district of TEL AVIV.
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