



# ON THE WAY TO A COORDINATE BASED CADASTRE (CBC) IN ISRAEL

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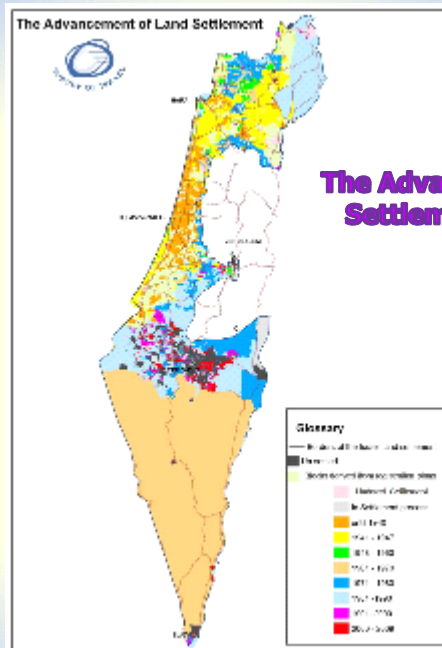


## The Roots of the Israeli Cadastre

- ❑ 1928, Land Ordinance of the British Mandate.
- ❑ Adopting Torrens Principles based on land surveys.
- ❑ Division into blocks and parcels for title registration .
- ❑ Responsibility shared by the Survey of Israel (SOI) and the Land Registry.

## The state of the cadastre today

- ❖ 95 percent of the lands already went through initial land settlement.
- ❖ 16,000 blocks, 800,000 parcels.
- ❖ Annual rates: 100-200 new settled blocks and 1,400-1,500 mutation plans.



## Problems in the existing Situation

- Since 1928 there is an accumulation of 1 million surveying documents.
- Parts of them miss coordinates and don't meet present standards and regulations.
- The non accurate data based on non uniform geodetic network cause inconsistency in comparison to the present APN.
- The preparation and inspection of mutation plans requires research and takes too long.
- The length of the registration process has a negative impact in many ways on the real estate business.

## The Suggested Solution

### Coordinate Based Cadastre (CBC) Principles:

- \* The boundaries of blocks and parcels will be defined by coordinates, accuracy < 5cm.
- \* Every mutation plan will be based on IG05 (APN or control based on APN).
- \* Full uniformity between mutation plans.

## The Suggested Solution

### The Benefits of a CBC:

- \* **Accurate infrastructure for land registration.**
- \* **Shortening the preparation and inspection time of mutation plans to days up to several weeks.**
- \* **Enhancing planning, construction and registration.**
- \* **Creation of an infrastructure for 3D Cadastre.**
- \* **Saving economical assets and investments.**
- \* **Acceleration of land based economic activity.**

## The Economic feasibility study

- **The Study was launched by SOI and the Ministry of Treasury in 2006.**
- **The results were based on an analysis after tens of interviews with leading persons from the Government, the private market, the academy and SOI.**
- **The estimated cost of the technical work of establishment of analytical boundaries was 100m\$.**
- **The recommendation was to invest 10m\$ a year for ten years.**

## The economic feasibility study

- The estimated direct saving was 15m\$ a year.
- The estimated annual contribution to the construction and entrepreneur Market was 150m\$.
- The study anticipated a breakthrough in the improvement of services of a list of Government Ministries and Agencies.

## The suggested plan

- ❑ A geodetic infrastructure including APN.
- ❑ Regulatory measures.
- ❑ Conversion of existing demarcation based and graphic driven DB to CBC.
- ❑ Re organization of the registration process at the Land Registry.
- ❑ Changing the order of precedence of cadastral boundaries giving precedence to registered coordinates.

## Stages in the transition

- ❖ **Creating an accurate geodetic infrastructure.**  
This has been achieved by 19 GPS stations.
- ❖ **Preparation of regulatory measures.**  
During 2003-8 professional instructions were published. An initial version of new geodetic and cadastral regulations has been prepared.
- ❖ **Conversion of existing DB.**  
The graphical documents had been scanned since the 1990<sup>ies</sup>, managed in a cadastral GIS and are available on line. Authentic physical points should be re-surveyed using the APN and serve for transformations.

## Stages in the transition

- ❖ **In the non-built state owned areas the task is relatively easy while in the built up areas the process is slow and costly. This requires a gradual implementation.**
- ❖ **Legal measures should be prepared to take care of conflicts of rights.**

## The doubts of the Ministry of Treasury

- The people of the Ministry of Treasury were convinced that the project is essential but their doubts refer to risk of private claims because of loss of property value of land owners due to the fact that land rights are guaranteed by the State.
- This was the reason for their requirement for an economic feasibility study and legal study of the risks.

## The Decisions of the DG of SOI

In order to overcome the doubts of the Ministry of Treasury, the limited resources and the gap of experience, the DG took a few decisions:

- \* To push forward the practical implementation in the non built and State owned lands.  
This reduced the risks of claims due to required changes of boundaries and areas.
- \* To begin with the low cost areas were the preparation of a CBC is around 200-500\$ per square km VS 5,000\$.

## The Decisions of the DG of SOI

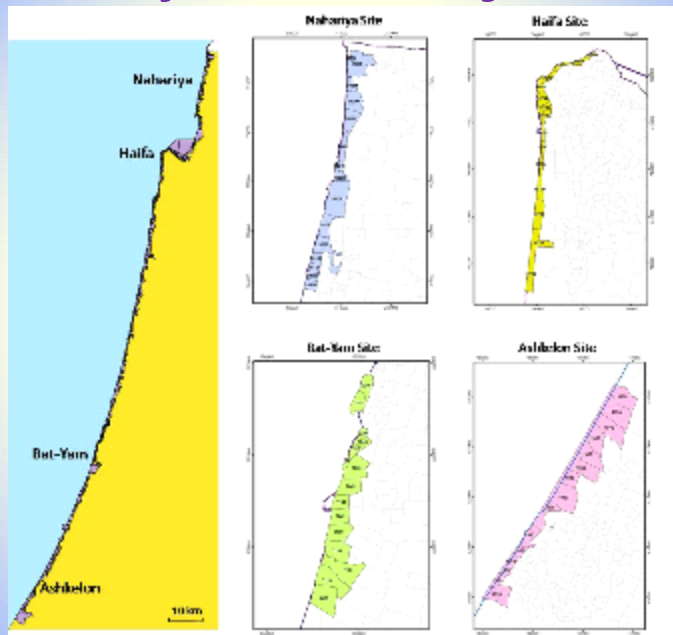
- \* To advance studies and development of procedures of integration of the results in the cadastral GIS and implementation of the results in the working process of surveyors.
- \* To advance transition to CBC of GPS based projects of the Ministry of Construction and Housing and of new mutation plans.

## Pilot Projects

- A pilot study in Modiin, the main goals of which were to define standards, working procedures, technical specs and guidelines.
- A Pilot project along the Mediterranean Coast. This included 60 blocks in varied areas from open areas to highly dense built up areas. This project included also requirements of R&D and recommendations for transformation. It served well as a feasibility study, as an R&D and as a basis for planning next projects. The results were already published for the use of surveyors.



### Pilot Project of Land Blocks along the Coast

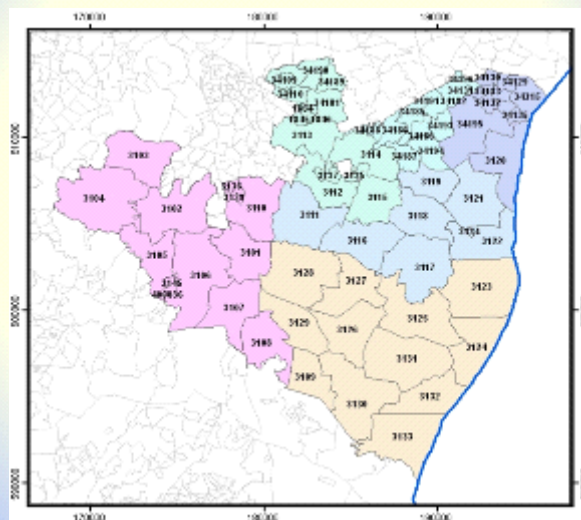


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### Implementation projects



- The Lachish Project in 2008 included transition to CBC of 69 blocks.

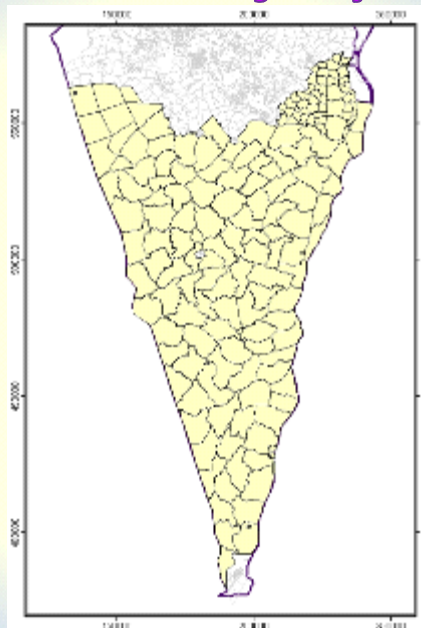


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## The Southern Negev project in 2009

- ❖ This project includes 192 blocks covering 45 percent of the area of Israel excluding the few settlements in the area.
- ❖ The original land settlement of this area was in the 1960<sup>ies</sup> on 1:20,000 graphic plans.
- ❖ Every block in this area contains 1-2 parcels.
- ❖ Very low density of authentic features.
- ❖ The lands are state owned.

## The Southern Negev Project



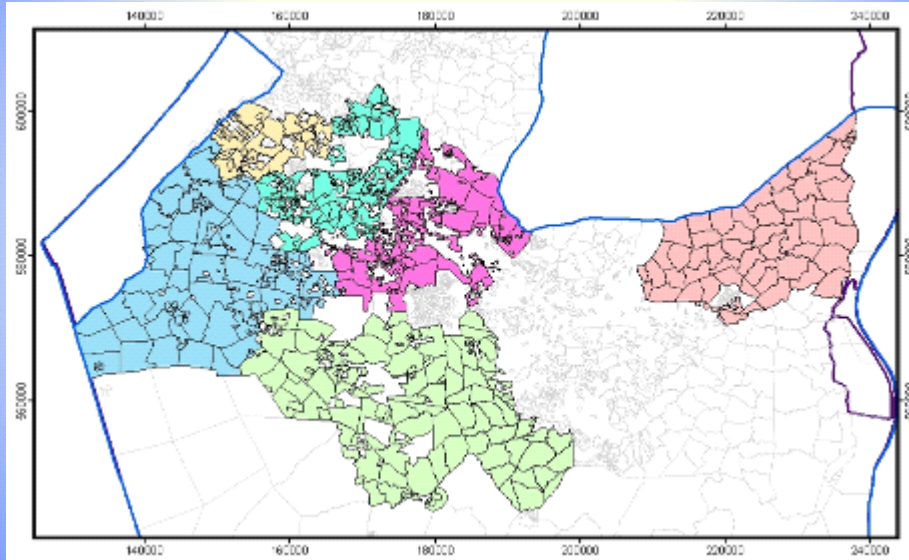
## The Northern Negev project in 2010

- Covers agricultural areas with small villages.
- The area is not continuous because not all of it is already land settled.
- The area is divided to 6 regions and 4 contractors including 700 blocks covering 10 percent of the area of Israel.
- The complexity of the regions varies from close to the easy southern Negev to that of the Lachish project with a range of cost of 2.5 between the higher and the lower.

## The Northern Negev project in 2010

- The most complicated region of this project served also as a pilot project for an estimation of the expected costs in the rest of the open areas of the country.
- The volume of work required in SOI for the analysis and integration of the results of this project requires a construction of a special team.

## The Northern Negev Project



## Integration of Ministry of Construction projects and ongoing activities

### MOC projects:

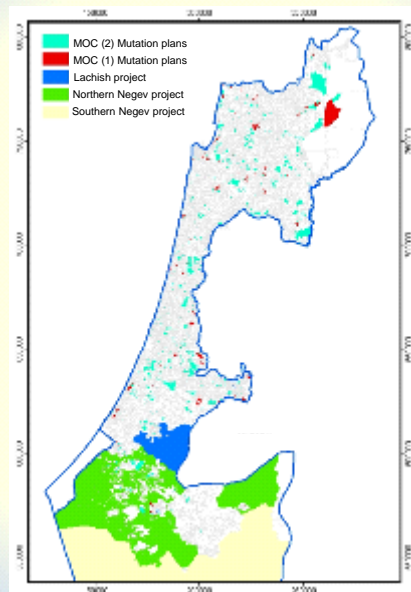
- \* Big projects in built up areas that were surveyed since the 1990<sup>ies</sup> using modern GPS surveys.
- \* The transition of these projects to CBC can be relatively fast and at low cost.
- \* These projects can serve as regional anchors for the CBC program.

## Integration of Ministry of Construction projects and ongoing activities

### Ongoing activities:

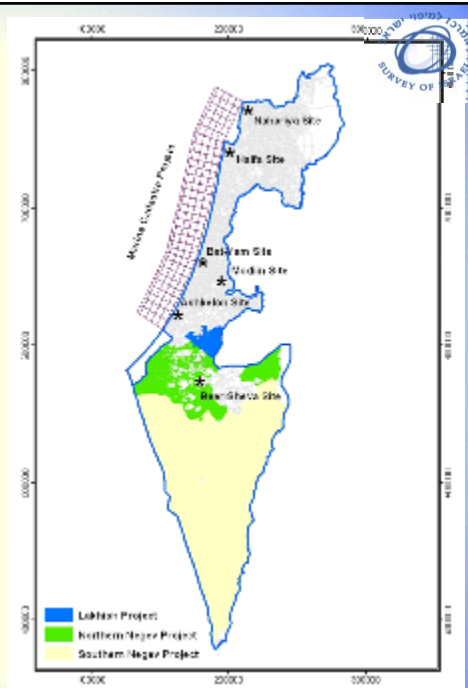
- \* New block plans and mutation plans that were prepared using the APN can be integrated after very thorough inspection and adjustment in the CBC program.
- \* This may add up to 1,000 block plans and up to 10,000 mutation plans.

## Transition of Ministry of Construction projects to CBC



## Marine Cadastre

- This is relatively a fast and low cost project.
- It includes around 2,000 blocks only in the Territorial Sea of Israel in the Mediterranean Sea.



## Multi Dimensional Cadastre

- A comprehensive 3D cadastre project has already been introduced by SOI in 2004.
- The implementation has been delayed because of slow preparedness at the Ministry of Justice. This will hopefully change in 2011.
- The practical implementation requires a CBC infrastructure.



## Authentic Physical Points

- ❑ Existing authentic physical points which were used originally as control points or as physical features along the boundaries, may be re-measured and serve for transformation as a component in the transition process.
- ❑ This process had been recommended as lessons of the pilot projects.

## Integration of CBC in the Cadastral GIS

- ❖ The cadastral GIS became an essential component of the process.  
Efforts are made to finish in 2011 an R&D to enable automated processing.
- ❖ In addition a gradation system is developed in the range of 5cm to 0.5 cm.

## Legal Activities

- ❖ **The overall goal is that the coordinates will become the legal definition of land boundaries in Israel and will take precedence over other sources.**
- ❖ **Meanwhile the first legal step refers to regulations and instructions prepared by SOI.**
- ❖ **Coordinates, which are results of CBC projects, are published by SOI and are considered as recommendations to surveyors to be used after an additional attempt to trace authentic physical points in the field.**

## Conclusions

- **The transition to CBC is an essential step forward of the Israeli cadastre.**
- **The ultimate goal is to register the coordinates as a final legal definition of land boundaries in the Land Registry.**
- **Meanwhile, following a few pilot projects the DG of SOI decided to continue with geodetic transition of boundaries to CBC, and to recommend the use of them by surveyors.**



## Conclusions

- Additional activities are advanced in parallel, including supporting geodetic infrastructure, publishing supportive regulations and DG instructions, as well as R&D efforts to enable integration of the CBC data into the cadastral GIS.
- The practical decision of the DG of SOI is to advance implementation of CBC projects in non built up or not densely built up state owned lands. These areas cover up to 86% of the country.
- The coverage of the on going CBC projects as for 2010 is 57% of the area of Israel.

*Thank you for  
your attention*