**Introduction**

The presentation of 3D spatial parcels and the development of spatial data visualization models play an important role in establishing the "**future 3D cadastre**".

Since there is no **3D-GIS** yet, an "**intermediate semi 3D system**" must be established in order to take the control of managing the 3D cadastral data.

**Considerations In Developing 3D Cadastre Visualization Models**

- The model proposed takes into consideration a number of practical aspects:
  - **3D cadastral registration methods**.
  - **3D spatial topology** in the future 3D-GIS.
  - **Accuracy** of cadastral constraints.
  - **Feasibility** of the database's application in existing CAD software.
  - Effectiveness in building 3D city models in the future cadastre for city planning purposes.

**Valid Models For Visualization Of 3D Objects**

- **Primitive Instancing**
- **Sweep Presentations**
- **Boundary Representations** — (b-reps)
- **Spatial Partitioning Representations** — (SPR)
- **Constructive Solid Geometry** — CSG

**The Proposed Method**

All geometrical objects could be established as a spatial linear operations of primitive solids.

- The Primitives that have been chosen are:
  - All geometrical objects could be established as a spatial linear operations of primitive solids.
  - The Primitives that have been chosen are:
    - CSG main disadvantage is its poor ability to produce **3D topology**.
    - Till now there is no final model for **3D topology**.
    - The important character is the possibility of the model to be converted to any other one.
    - CSG is better than b-reps.
The Proposed Method

- An example for the **Sweep representation** model as one of the CSG primitives:

Additionally the **Sweep Representations** Model is vital for adding the 3D dimension for a 2D parcel and 2D buildings to the ordinary 2D Cadastral maps.

The linear spatial operations are:
- Union
- Intersection
- Subtraction
- Slicing

An example for the **Sweep representation** model as one of the CSG primitives:

The main advantage of the proposed alpha-numeric cadastral data format in Israel it continues the existed 2D cadastral data format.

More details about the "3D Alpha-Numeric" could be found in the paper.

Development Of Alpha-Numeric Data Format For Saving The 3D Spatial Measured Data

- The main advantage of the proposed alpha-numeric cadastral data format in Israel it continues the existed 2D cadastral data format.

- More details about the “3D Alpha-Numeric” could be found in the paper.

3D alpha-numeric data format is needed in the 3D future cadastre order to:
- Semi-automatic production and automatic 3D representations.
- Conversion to the future 3D GIS.
- Preparation of the 3D Cadastral data for the 2D GIS system.
- 3D visualization and 3D City Models executions.
- 3D reparcelation planning map preparing.

Conclusion

- The proposed Method advantage:
  - simplicity and its effectiveness.
  - it fulfills the needs of any proposed registration model.
- It is simple to be converted to any other model format such like b-reps. Even 2D projection format managing by 2D-GIS.
- Its main disadvantage is enable to produce 3D topology directly.

Experimentation

By using the proposed method, the 2D cadastral map, could be converted to 3D ones including all 3D parcels and the 3D sub-parcels.

It fulfills the needs of any proposed registration model.

It is simple to be converted to any other model format such like b-reps. Even 2D projection format managing by 2D-GIS.

Its main disadvantage is enable to produce 3D topology directly.