

Development of a Cutting-Edge 3D Cadastral Management System

Shlomi (Shlomo) Sivan and Yaron Felus (Israel)

Key words: Access to land; Cadastre; e-Governance; Land management; Security of tenure; 3D Cadastre

SUMMARY

This article outlines the creation and implementation of a groundbreaking 3D Cadastral Management System in alignment with Israel's new 3D land registration law. This innovative development seeks to transform land registration by introducing 3D Parcels, volumetric units defined by 3D boundaries, accommodating both above and below-ground properties, with distinct ownership rights delineated by 3D corner points.

In 2018, the State of Israel enacted a pioneering 3D land registration law as an amendment to the Real Estate Law, thereby necessitating the Survey Office Israel (SOI) to adopt this new legislation. In response to this mandate, SOI initiated a rigorous selection process and eventually awarded the contract to Sivan Design (www.sivandesign.com) for the creation of a cutting-edge 3D Cadastral Management System.

At a preliminary stage, SOI formulated a new 3D cadastral process that extends the traditional national cadastral database of 2D parcels. The system now encompasses a new category of 3D objects: 3D Points, which serve as the foundation for Subtractions, which, in turn, define the 3D Parcels.

The input to the new database is the 3D Cadastral Plans which are submitted in accordance with the new 3D CAD Standard. Another important preliminary stage included the compilation of 2 tests dictionaries – the Migration tests dictionary and the Advanced tests Dictionary.

The 3D Cadastral System development was then commenced and the process consisted of the design, development and implementation of the following components:

Development of a Cutting-Edge 3D Cadastral Management System (12710)
Shlomi (Shlomo) Sivan and Yaron Felus (Israel)

FIG Working Week 2024

Your World, Our World: Resilient Environment and Sustainable Resource Management for all
Accra, Ghana, 19–24 May 2024

- D1 – 3D Cadastral Database to support legislation.
- D2 – A migration tests engine.
- D3 – A quality control and quality assurance engine.
- D4 – A CAD to GIS migration engine.
- D5 – A 3D Cadastral GIS based viewing and editing environment.
- D6 – The system's management platform.

The system was developed using micro-services system architecture. ArcGIS was selected as the core GIS platform. Tests engines (D2 + D3) were designed and developed with more than 120 different types of automated compliance tests. A 3D CAD to GIS migration engine (D4) was then developed, following by the setting up of a 3D Cadastral GIS based viewing and editing environment (D5). In Parallel, an extended management system which allows users to modify the tests dictionaries, load and manage 3D Cadastral Plans, categorize them into Tasks or Projects, run Compliance Tests on these plans, and finally integrate them into the national 3D Cadastral Database, was developed and deployed.

The article concludes with a demonstration of a few practical cases of loading, analyzing and integrating of 3D Cadastral Plans into the 3D Cadastral System.