

INITIATIVES TOWARD A 3D GIS-RELATED MULTI-LAYER DIGITAL CADASTRE IN ISRAEL

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ABSTRACT

The northern half of Israel, where land is highly utilized, is today one of the most densely populated areas of the world. To enable continued extensive land development, new options need to be found for urban development through more effective utilization of space both above and below the ground surface (as well as beneath the sea).

The Survey of Israel (SOI) and the Technion - Israel Institute of Technology initiated in 1996 a joint research and development project, aimed primarily at analyzing the 3D cadastre as a technology base for spatial management and registration of the real estate properties. The rationale of this R&D project was that above and below the ground planning and development activities can be considerably accelerated by guaranteeing the property rights of the owners.

At an early stage of investigation, an ad-hoc forum was founded with participation of representatives from both the government and public sectors, as well as from the private sector. Principal activities and field experiments were designated, and a pilot project was completed. A typical test area in the pilot project was composed of built-up facilities situated on the ground, above the ground, and below the ground, all of which were measured in three dimensions. Concurrently, basic geometric and geodetic principles of a three-dimensional cadastre were consolidated, and approval was obtained for the tenet that a thorough and authentic legal investigation is indispensable to this process.

A government resolution adopted in Israel in mid-1999, gave a directive for a legal, technical and administrative preliminary investigation of the complex issues of optimizing spatial land use in Israel. According to the resolution, an interdisciplinary expert study is to be prepared and reported to the government by the end of 2001. This task has been assigned to the Ministry of Justice in the role of coordinator.

Thus far, a basic legal study has been completed, serving as a guide for both legal and technical experts in this matter. Concurrently, the Survey of Israel is proceeding with evaluation and with securing the necessary budget for technical development and initial practical implementation of a 3D cadastre in Israel in the coming decade.

This paper, focusing on the technical and legal aspects, reviews the research, development, experimental and administrative steps that have been made. Main

consequences are summarized, and global plans of the activity in near future are described.

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BIOGRAPHICAL NOTE

Prof. Yerach Doytscher graduated from the Technion - Israel Institute of Technology in Civil Engineering in 1967. He was awarded M.Sc. and D.Sc. degrees in 1972 and 1979 respectively in Geodetic Engineering, also from the Technion. Until 1995 he was involved in geodetic and mapping projects and consultation within the private and public sectors in Israel. Since 1996 he has been head of the Geodetic Engineering Division within the Department of Civil Engineering at the Technion, and currently also heads the Geodesy and Mapping Research Center at the Technion. Published more than 110 original papers in Professional Journals, Conventions Proceedings and Scientific Reports. Supervised more than 30 graduate (PhD/DSc/MSc/MA) students. The Israeli representative to Commission 3 of FIG.

Dr. Joseph Forrai was awarded an M.Sc.(1974) and D.Sc.(1980) degrees at Technical University of Budapest, Hungary. Dr. Forrai was Lecturer and Senior Lecturer at TU Budapest, Tel Aviv University, Israel Institute of Technology (Technion) and Bar Ilan University (Tel Aviv) since 1976. Appointments at the Survey of Israel: Chief of

Research Division (1987-1992); Head of Photogrammetry Department (1989-1993); Deputy Director General (1993-1994), and *Chief Scientist* (since 1995). Professional and research background (partial): crustal movement detection; photogrammetric data acquisition (national GIS topographic data base); permanent GPS station network; GPS support for geodynamics. Memberships of the Israeli Society of Photogrammetry and Remote Sensing (*president*); Association of Licensed Surveyors in Israel; Israeli Cartographic Society.

Advocate Gili Kirschner was awarded LLB (1989) and LLM (1996) degrees at Hebrew University, Mount Scopus, Jerusalem. Between 1990 and 1998 worked with several law offices in Israel, engaged with supervision and management of acquisition and registration of dwellings for social residence, legal advice to urban renewal and restoration projects and to real estate developers. Since 1998 fills the legal advisor's position at the Survey of Israel (the governmental agency for surveying, mapping, cadastre and GIS). Member of the Israeli Bar, the Israeli Society of Photogrammetry and Remote Sensing and the Israeli Cartographic Society.