

Methodology for developing executive decision support systems for housing and operating organizations using GIS

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Currently, issues of effective territory management are very relevant. Especially at the local level, starting with districts, because the latest updated information about the condition of buildings and adjacent territories, roads, engineering communications is highly relevant. Many quality indicators determine the effectiveness of executive decision-making: representativeness, meaningfulness, sufficiency, availability, relevance, timeliness, accuracy, stability, and visibility. To improve these indicators, it is necessary to consider a large amount of initial data, information from various sources and constantly update the data. Therefore, it is recommended to use GIS, which will significantly increase the efficiency of executive decision-making.

A methodology was developed using the example of three Kharkiv districts. With the help of Sentinel 2 space imagery and the OpenStreetMap base map layer in ArcGIS 10.8 software product, a vectorization of the boundaries and infrastructure of districts was conducted, with special attention being paid to residential buildings. Information for database seeding was obtained from 2GIS and Google Maps geoportals. For the buildings layer, a field with a variety of building types was created, with the help of which, after finalizing vectorization, categories were highlighted in different colors according to the value of the "Type (Building type)" field. A field with a variety of road types was also created for the roads layer, similar to the housing layer. The results of vectorization are presented in figure 1.

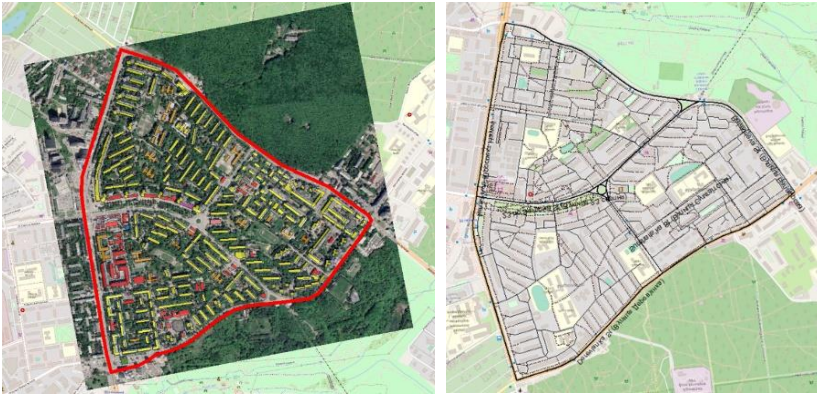


Figure 1. Left - boundaries of districts and buildings, right – roads

Additionally, such vector layers were created: Parking spaces, Green spaces, Sport grounds, Residential areas. The final result is presented in figure 2.

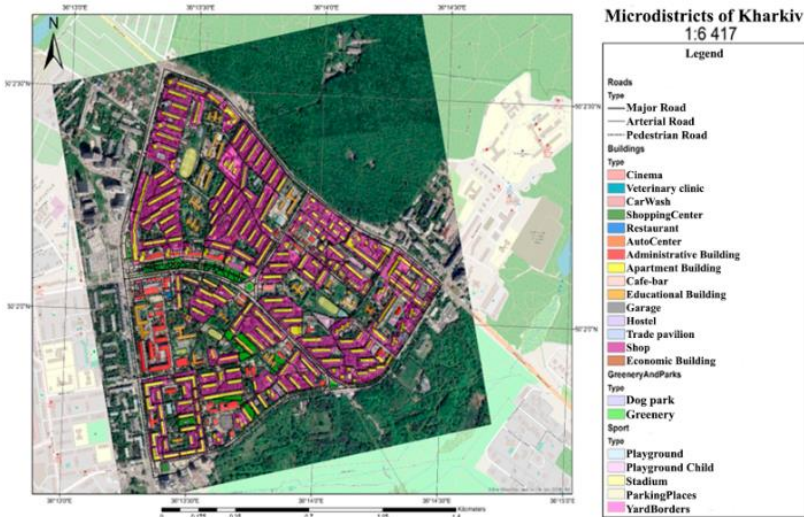


Figure 2. Cartographic model of Kharkiv districts

The next step was the addition of known attributes to the relational database and usage of the function that connects tables and calculates the field, obtaining new data. It should be noted

that all information is taken from open sources. The general methodology of the executive decision-making support system for housing-operating organizations is presented in figure 4.

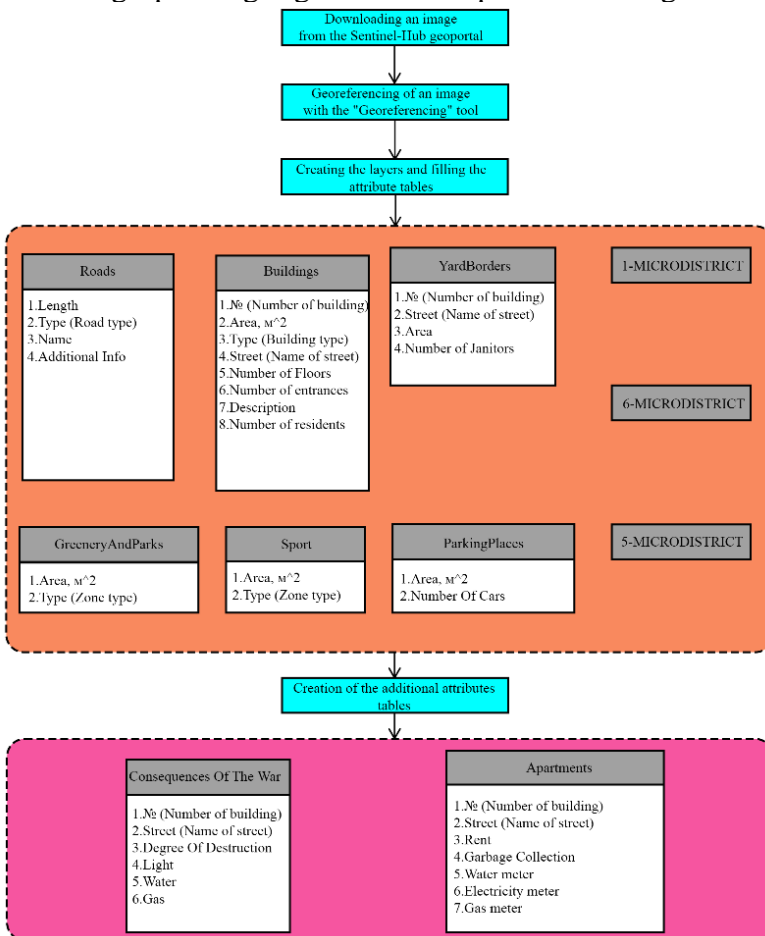


Figure 4. Methodology for developing executive decision support systems

As such, usage of GIS in the work of housing and operating organizations is expedient and effective, especially in wartime.