THE USE OF THE CADAstral INFORMATION SYSTEM (CIS) FOR MANAGE AND CADAstral DATABASE QUERY

Cristian HUȚANU¹
E-mail: hutanucrst@yahoo.com

Abstract

The MapSIC software is a Cadastral Information System (CIS) which allows, by its interactive features, to manage and query the CIS Database and Digital Field Model, represented by level curves in 2D form or by color, depending by relief height, in 3D form. Through its multiple facilities meet the technical requirements of the imposed cadastral works, both in inside and outside of the city.

Its main functions of import, export, digitizing/vectorization, as well as compatibility with software for processing field’s raw data (TopoSys) and with GIS (Geographic Information Systems) complex software systems, ranks the MapSIC software in the segment of applications that are producing directly geo-informational data, bringing remarkable benefits of these data users. It suffices to think of the possibility of real-time updating of information related to graphic and alphanumeric objects.

To achieve the CIS Data Bank was chosen as the study area, the former vineyard unit SAE Copou Iași with a total area of 111 hectares, located, until 2007, in the outside of Iași City.

The initial cadastral data, from surveying done in 2004, have been updated based on the land register documentation approved by the Cadastre and Land Registration Office Iași (OCPI Iași) and on the reception of General technical cadastrre made for the north-west of the City of Iași.

Updating cadastral data was necessary due to changes caused by the recognition of the right of ownership to former owners, according to the Law No. 18/1991, the Land Fund law, and due to the existing documentations of dismantling of land parcels, because of the inclusion of study area in the extended inside of the City of Iași since 2007.

The MapSIC software was conceived from the desire of capitalization of the obtained data, by choosing and adopting the best solutions in terms of socio-economic view.

Key words: agricultural cadastre, topographic-cadastral digital plan, Cadastral Information System

MATERIAL AND METHOD

In order to obtain a cadastral database and a digital cadastral plan for the former vineyard unit SAE Copou Iași, which later, in 2004, became Vinifruct Copou, was made the lifting in plan of the points of detail, using the electronic measuring equipment (Huțanu, Cr., 2010).

The need for topographic measurements reflected the cadastral changes that occurred in time over the land parcels. If, initially, in 1965, in the area under study was designed and established, according to the conditions of relief, a vineyard unit, after 1990 the parcels situation (Huțanu, Cr., 2011), speaking in cadastral terms, gradually began to change due to:
- implementation of Law no. 18/1991, for restoring property rights of former owners;
- the Cadastre and Land Registration Office Iași endorsement of the dismantling documentations of land parcels;
- inclusion in the constructed area of the City of Iași, from 2007;
- conditions imposed by Law no. 50/1991, authorizing the construction works and some measures for housing.

¹ University of Agricultural Sciences and Veterinary Medicine, Iași
RESULTS AND DISCUSSIONS

For example, Vinifruct project database (fig. 1) was formed by storing records of each object attached to layers resulted from General Technical Cadastre.

Defining a new layer, for attaching the database in Microsoft Excel, is performed by accessing the function New Layer from the File menu.

In the window New Layer will be written in the field Layer Name the name of the new layer, without spaces and diacritics (PLOT_SUMMARY) and from the field Layer Type will be selected the option Table. So that this sheet of plots to be compatible with the AutoCAD’s file, after the activation of the layer, will be accessed the function View All from the menu Database, for viewing the window that will contain, under the form of a table, the Microsoft Excel data file.

The main work functions from the data entry window are:

- **New Field** - the name of a column in the table, but no longer than eight characters;
- **Use column for external link** - the connection of a column from the table with the server;
- **Find / Replace** - search and replace data in the table shown;
- **Check Valid Images** - check the accuracy of the connection of the data from the table with the associated graphic elements.

![Figure 1 Simultaneous view of the sheet of plots and digital plan](image-url)
The import of the data file from Microsoft Excel will be possible to be done if by the function New Field will be created, in the sheet of plots of the program, an identical table header.

While the Microsoft Excel file is opened will be selected only the rows and columns that we want to import in the draft program, so it could to be saved, for example, under the name VINIFRUCT in the field Name Box. Then, by clicking the function Import from Excel from the menu Database of the draft program, will be opened the window Import Excel Structure, which allows us to import the table structure from Microsoft Excel.

Because all the conditions of compatibility are met will be pressed the key Load Excel fields to create association links between the layer PLOT_SUMMARY from the Program MapSIC and table structure saved under the name VINIFRUCT in the field Excel Source table, respectively with the file saved under the name Vinifruct.xls in the field Input Excel file.

By pressing the key Next, opens the window Import Excel Records, which allows the transfer and data recording in the sheet of plots.

Transferring data displayed in table VINIFRUCT - Excel in the table PLOT_SUMMARY of the MapSIC program is done with Import data key.

As display options, data lines of the 660 plots can be ordered alphabetically from A to Z, if the top of the triangle from the key OWN_NAME is pointing down or from Z to A if it is pointing up. Regardless of the option chosen, the data will be copied by the MapSIC program in the order in which were saved in Microsoft Excel.

Data imported from Excel in the layer PLOT_SUMMARY will be saved with the extension .dbf.

Once the conditions of compatibility are met and connection links made between the lines of table from the sheet of plots and polygons parcels of the active layer, can be accessed various features of the program to query the data from the sheet of plots of the project.

Simultaneous viewing of the graphic elements and of the matching database records is due to the function Show Table And Map from the sheet of plots toolbar. When activating this function the application window is split in the up area, in which graphic elements of the digital plan are displayed, and the below area, in which will be displayed the records attached to a parcel polygon from the layer PROPERTY_BODY_L. (fig. 1).

By the activation of the function Find / Replace from the sheet of plots toolbar (fig. 1) opens the window through which you can search or replace some data in the table.

By using Find All option, after selecting the column and writing the search element (fig. 2), because you can not view all table lines, under the sheet of parcels will be shown the number of replacements made in the table (fig. 1).

Ability to view only selected lines (for example: of the data of the 4 recorded lines, which contain the search element, from the total of 660 lines of the table) will be done by accessing the menu function View Selected from the menu Database.

If you click on a line identification number will automatically select both the line from table and the polygon, which corresponds to the data, being displayed in the foreground, in the digital plan window, with bold and a specific symbol on the fraction points from the contour (fig. 1).

By activating the option Replace All, after also writing of the replacement element in the field Replace with (fig. 2), under the sheet of parcels will be shown the number of replacements made in the table (fig. 1).

Selection of plots by the size of the area is made through the function Simple Query (fig. 3), from the menu Analysis on the toolbar of the program.
After setting the search parameters from the columns *Condition* and *Value* (for example: $\geq 1000$ m$^2$), is pressed the key *Go To Sel* (fig. 3) and in the sheet of plots table will only be shown the data lines for plots which have the area that meets the search conditions (fig.4).

The display of the selected lines is made in the order they were recorded in the table, keeping the identification number of the line, to retain the link created with the graphic elements of the digital plan. However, under the sheet of plots will be shown the number of registered lines (206), which meet the condition set, from a total of 660 lines of the table. When the polygon contour of a parcel changes, the perimeter and area of the plot will be updated through *Polygon tools* function from *Draw* menu.

The display in the table, by the MapSIC program, of the areas recalculated for parcels is in square meters and the perimeter of polygons in meters. Under the sheet of plots will be shown the number of changes occurred in the total of rows in the table.

At the end of the project will appear a window where files are checked with the extension .shp, in which were made changes. Confirmation of changes is done by pressing the key *Yes*.

For 3D visualization of the digital plan, from the access window of the MapSIC program, will be pressed the key *3D Preview* to activate interactive functions for representing digital model of the study area terrain by shading or coloring depending on the height of the relief.

It is possible to view 3D digital plans if checking one point from the layer *DETAIL_POINT* it will appear joined in a rectangular box, next to the plane absolute coordinates, also its altitude (for example: x=634886.58 y=692738.45 z=124.77). Then, to get a prospective image of the study area, in the layer *PROPERTY_BODY* are saved plots polygons obtained by the union of quoted points.

Land relief rendering elements, saved in the layer *LEVEL_CURVES*, will have the same properties with parcel polygons, if they have been obtained using the program Surface Mapping System.
Enabling only these three layers, by turning them in different angles, we will be able to view the perspective image of the digital plan.

In figure 5 is presented the perspective image of the digital plan in the south-west of study area.

![Figure 5: The viewing of the perspective image of the digital plan](image)

The viewing of the digital plan under different angles will be made based on the left-right rotation options from the toolbar of the menu **Draw** and on the mouse scroll wheel to rotate up and down.

For the representation of the terrain digital model by color, depending on the height of relief, is activated the option **Shape Fade** of the function **Statistics**, from the menu **Analysis** of the MapSIC program.

In the open window it is chosen the layer **LEVEL_CURVES** to determine color ranges towards linear elements (fig.6), which will become a base for the representation of the relief by color.
Exclusion or adding rows to the table, to decrease or increase the number of color ranges, is made by modifying existing digit in the field Number of Steps. The option name itself suggests to us that the transition from one color to another is done gradually.

Finally, pressing the key Apply, depending on the selected colors for each rates range, the program displays, in the application window, the digital model of relief by color (fig. 7).

These interactive features are designed to provide choice and decision making, using elements from the database or graphical information.

CONCLUSIONS

The benefits of digital topographic and cadastral plans are that database updating is done in a short time and at low cost.

Cadastral Information Systems are designed from the desire to capitalize more efficient the data obtained.

BIBLIOGRAPHY


Huțanu, Cr., 2011 – The cadastral changes that occurred in time over the parcels of the vineyard unit SAE Copou – limitrophe to the inside of the city of Iasi, Scientific Works, The 54 volume, Horticulture Series, U.S.A.M.V. Iasi.