THE USE OF SPATIAL IMAGES
IN THE PROJECTS OF URBAN DEVELOPMENT FOR BUCHAREST

Key words: Spatial image, city of Bucharest, urban development project, geospatial analysis

Abstract: In Romania, spatial images are used more and more often in the studies meant for urban development projects. Together with the topographic plans and the aerophotogrammes, they prove to be extremely useful documents, especially for the projects referring to big cities, with a rich historical past, complex as structure and functions, undergoing development and renewal. This paper focuses on the case of the city of Bucharest, the capital of Romania, an important European metropolis (2,000,000 inhabitants). It highlights the advantages of high-resolution satellite images (IRS, SPOT), recorded at different time intervals, in the elaboration of urban management studies and plans. By geospatial analysis we can successfully approach the following problems concerning the organization of the urban area of Bucharest: the exact knowledge of the urban territory in its dynamics; tracing the locations of the future urban management plans. All these aspects are presented and demonstrated by extracting characteristic zooms of the full satellite image of Bucharest and by interpreting them adequately. The realization of these images can inspire the people involved in elaborating and achieving Bucharest’s urban management programs.

1. Introduction

The spatial images are used more and more often in the studies meant for urban development project. The paper approaches the multiple benefits of using the computerised satellite images in managing the urban territory. The analysis of the satellite images (IRS, SPOT, etc), indicate some problems of the organization of the urban territory of Bucharest, as well as structure, density of constructions, street system, functional areas and disfunctionalities of the city’s development.

2. The knowledge of the urban territory through the analysis of the satellite images

The analysis of the satellite images through the computerised visualisation allows the exact knowledge of the many aspects concerning the organization of Bucharest’s urban territory: general and detailed structure; density of buildings, streets and surface traffic; neighborhoods and functional areas and their architectural particularities; urban habitat quality; town – rural areas reports; contrasts and disfunctionalities in city’s development.

This paper stresses out only two aspects:

1. The city’s structure with accent on the most important changes occurred in the last two decades.
2. The functional zones with their architectural aspects, infrastructure and habitat quality.

2.1. City’s structure

The satellite images show that Bucharest has a radial – concentric structure. This structure is a result of the particular way of the city’s development over more than 5 centuries (documented since 1459). The city has expanded in a concentric manner
around a medieval centre (princier house – named Curtea Veche) as well as a radial one along the roads to the capital of Valachia, and later all over Romania, in modern city of Bucharest (approximately 2 millions habitants and 230 km2).

The analysis of the IRS satellite images shows significant variations in the organization of the urban space among central, median and peripheral zones, as well as from neighborhood to neighborhood (Fig. 1). These contrasts are based on the historic and economic factors of the development of different parts of the city, which in their turn have had an effect on the urban system functions.

There are two types of structures in the central and median zones that are in a continue change. The first type is an old one of a mase type (chaotic with oriental reminiscence) inhabited from the old city. The second type is a modern and rectangular one, of an occidental type, which has grown and interfered with the first one.

The major avenues that cross the city from N to S and E to W, which have been fitted out in the 2-nd part of the 19 century and along the 20 century are very representative for the 2-nd type of urban structure.

On outskirts, which are partially inhabited, there are different urban structures that vary from simple geometrical buildings, of a rectangular type (i.e.: Vatra Luminoasa, Floreasca) to more complex buildings, as seen in some large neighborhoods such as Balta Alba, Titan, Drumul Taberei, Militari, Berceni (Fig. 2).

The satellite images taken from time to time relieve the major changes that took place in the entire urban structure of Bucharest in the last 20 years as a result of the grand view of communist era regarding the systematisation program of Bucharest. The major avenue Victoria Socialismului (Socialism Victory) nowadays Unirii Boulevard and humangus building of Casa Poporului (these days Parliament Palais) represent a major and severe intervention in the urban structure.

These compelled interventions in the functionalities of the urban system have also disturbed the connections among different parts of the city.

2.2. The functional zones

The satellite images help to identify and define the limits of the functional zones, as well as to establish connections and overlapping areas. In fact, this is the current problem affecting in rapport between residential and industrial zones, the last ones, very often being a source of pollution.

The same satellite analysis also emphasizes the particularities of the functional zones from different points of view: the architectural aspect of the city, streets and surface traffic, certain components of urbanistic infrastructure, habitat quality. In this view, there are clear contrasts among the central, median and peripheral zones. The central zone, with its far more complex functions (politico-administrative, cultural, entertainment, residence, etc) displays monumental buildings (continually built from the end of 19 century till these days). The median zone is mostly a residential zone with private houses of a traditional fashion, modestly equipped.

The peripheral zone consists of residential neighborhood, with characteristic tall buildings of 4-10 floors, poorly equipped as well as industrial buildings and amusement parks and lakes (Fig. 2).
Figure 1 – A satellite image (IRS, 2002) on Bucharest City – useful document for urban development projects. A – central zone; B – median zone; C – peripheral zone. 1 – Parliament Palace; 2 – Unirii Square; 3 – Unirii Blvd.; 4 – University Square; 5 – Victory’s Square.
By analyzing the satellite images of Bucharest, the dysfunctions between down town, with its important administrative and social functions and its large residential neighborhoods (same of them 300,000-400,000 habitants) and the neighborhoods from the peripheral zones becomes noticeable.

The most important obstacle between the two zones (central and peripheral) is represented by the streets and traffic surface (over 5000 streets) and by an insufficient ruttiere systematization.

3. Implementing of the urban development projects utilizing the spatial images

By analyzing the satellite images it allows us to precisely localize and define the areas that require important interventions for adequate management of the urban space (Fig. 3):

- Curtea Veche and the neighboring streets, in order to rehabilitate the medieval town center;
- The new civic center (the Parliament Palace and Unirii Boulevard) in order to finish the works started on it;
- The middle part of the city (between the central area and the ring of boulevards), having a traditional residential function, in order to improve the habitat quality;
- Outskirts’ residential neighborhoods, made up of blocks, for the improvement of their urban equipment;
The free spaces in present neighborhoods (developed along the axes of penetration in the city), with a view to the management of the new residential neighborhoods;
Sectors meant for completing the street system, in order to improve the urban and transit traffic (connections on the inner ring and on the north-south axis).

4. Conclusions
The satellite images give not only a global view of the city but also a correct approach to the specific urban problems, continually developing and updating the urban structure.

The analysis of the IRS Bucharest, global and detailed satellite image, has revealed several aspects regarding the current and precise knowledge of the characteristics of the urban space (structure, buildings densities, streets, functional zones, urban habitat quality, disfunctionalities in the city development) and identification of the city’s particularities needed for a better urban management.

References
ANTRIX, SI, EUROMAP – http://www.euromap.de

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