Conversia 2007 resulting from the brainstorming technique

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Abstract: *The main aim of the project "Conversia 2007 resulting from the Brainstorming technique" is the conversion of land location and demarcation plans from the analogue format into the digital format, establishing a cartographic database and a digital archive within a unitary system at nation level, for the efficient administration and in good conditions of the sporadic cadastre work in each territorial administrative unit, from Brainstorming technique.*

Keywords: *Conversia 2007, Brainstorming technique, PAD, PTC, PP.*

I. Introduction

The role and the importance of cadastral survey in a democratic regime and with a competitive market economy have been widely acknowledged.
The basic objective of general cadastre is the complete knowledge in its main aspects of the total surface of land and construction, knowledge then expressed in the form of clear and systematic records. In order to define these immovable assets the technical cadastre must answer in fact three main "questions" which address different "aspects" and generate corresponding "functions" which in turn are accomplished through a series of "basic achievements".

1. Listing the three innovative projects of the present paper

PROJECT 1: **The index cadastral plan**, recommended in the already mentioned Technical Standards as a "cost-efficient solution", has been susceptible to debates in view of its characteristic faults.
PROJECT 2: **The ortho-photographic plan/ aerial topographic map**
In the last years, photographic aerial records have been carried out on the whole country level, using modern recording techniques including digital cameras and GPS receivers. They allow solving with some degree of accuracy the traditional geo-topo-photogrammetric problems.
Using these modern work techniques, photogrammetric plans of a special nature called orthophotoplans have been carried out.
PROJECT 3: **Conversion 2007**
Lately, in our country an project entitled Conversion 2007 designed at national level has been implemented. It implies the following work categories:
-collecting all cadastral survey plans, land location and county distribution plans, as well as the UAT classification;
- verifying and checking these pieces including the rejection of those below standard, namely the conversion of analogue plans into digital plans, using modern techniques like scanning vectoring and digitization;
-geo-referencing and bringing these plans to the same scale, as they enjoy a special level of attention, using the same modern techniques;

-setting up a database of vector data and exporting the files;
-drawing up the final documentation.
The cadastral survey plan of a UAT is meant to be completed through the assembling of these confirmed, acknowledged pieces in order to be adequately accurate to some exigencies. Naturally the UAT should be precisely outlined in order to serve as a parameter criterion for the activities of this project.

II. Documenting the chosen innovative topic
The chosen topic is Conversion 2007

1. THE GENERAL OUTLINE OF THE PROJECT

1.1. The objective of the project

The plans of land location and demarcation of buildings are carried out with a view to a non-final registration in the land book of the juridical deeds and facts concerning lands and constructions situated on an administrative-territorial unit for which there are no final documents in the general cadastre. Over the years, several normative documents, technical norms and instructions have been elaborated and published which have regulated the contents and the method for drawing up the cadastral documentation.

1.2. The Aim of the Project

The main aim of the project is the conversion of land location and demarcation plans from the analogue format into the digital format, establishing a cartographic database and a digital archive within a unitary system at nation level, for the efficient administration and in good conditions of the sporadic cadastre work in each territorial administrative unit.
Furthermore, another goal is the increase in efficiency of the logistics for providing cadastre information.
The graphic support for the specific cadastre documentation consists of the existing cartographic documentation, ortho-photographic plans, topographical and cadastre plan, topographical plans for old land books done on the scale of 1:500-1: 5760. In the project, these plans will be scanned, geo-referenced and archived in a unitary structure pre-established by the National Agency for Cadastre and Real-Estate Publicity.
The final products that are to be issued to the beneficiary are:

a) PDF files resulted from the process of scanning of PAD documentations;

b) CP files which have been introduced into the database;

c) The MDB file which contains the database in PersonalGeoDatabase format (ESRI);

d) The raster data obtained through scanning and geo-referencing the cartographic material (TIF and TFW files) ;

e) The data in vector format furnished to the issuer by OCPI and or data resulting from the vectoring process of the existing plans.

The aim of the present preliminary Report is identifying the critical aspects of the project and activating the beneficiaries (OCPI) in order to implement the project in optimum conditions.

III. Organizing a Brainstorming Session

The Brainstorming technique is also known under many names and variants like the Osborn Method. It is maybe the most widely used technique, both because it has been used since 1983 and especially because in many cases it has set the path towards success. The method was suggested by Alex F. Osborn, the deputy dean of Buffalo University, U.S.A and it used as a source of inspiration a techniques used 400 years ago in India called "Prai-Barshana" ("Prai" meaning "outside yourself" and "Barshana" meaning "question".)
The stages of the creative process have been acknowledged as :

- The Preparation which consists of :

-detecting the problem,
-defining the problem with the analysis of the significant data

- Finding the idea (the incubation + the enlightenment), which consists of:

-generating new ideas, finding new leads, selecting ideas with chances of achievement

- Finding the solution, which consists of :

-evaluating (verifying) the solutions suitable for application,
-the final decision.

The meeting was held on the 4th of Februry 2008 and it involved 7 persons, namely:

-ing. M. D. M.
- ing.U.F.38 years
- ing. B.C. 43 years
- jurist. E.L. 46 years
- ing. K.E. 38 years
- inf. D.C. 40 years

The session started at 3: 15 PM and ended at 4 PM, with M.D.M acting as a group leader.

IV. The critical analysis and the classification of ideas

Of all the ideas put forth in order to establish the stages of the project the following were eliminated:

- Those ideas that necessitated too much work time
- Those whose object was necessary to the achievement of the project.

Consequently after grouping and combination the following stages of the project were established:

1. The work project
2. Scanning the land location and demarcation plans
3. Scanning the existing cartographic documents
4. Geo-referencing Type B land location plans
5. Geo-referencing topographic and cadastre plans , Type A plot plans
6. Geo-referencing topographic and cadastre plans , Type B plot plans
7. Founding the PAD vector data database
8. The export of CP and MDB files
9. Establishing the digital data archive
10. Drawing up the final documentation

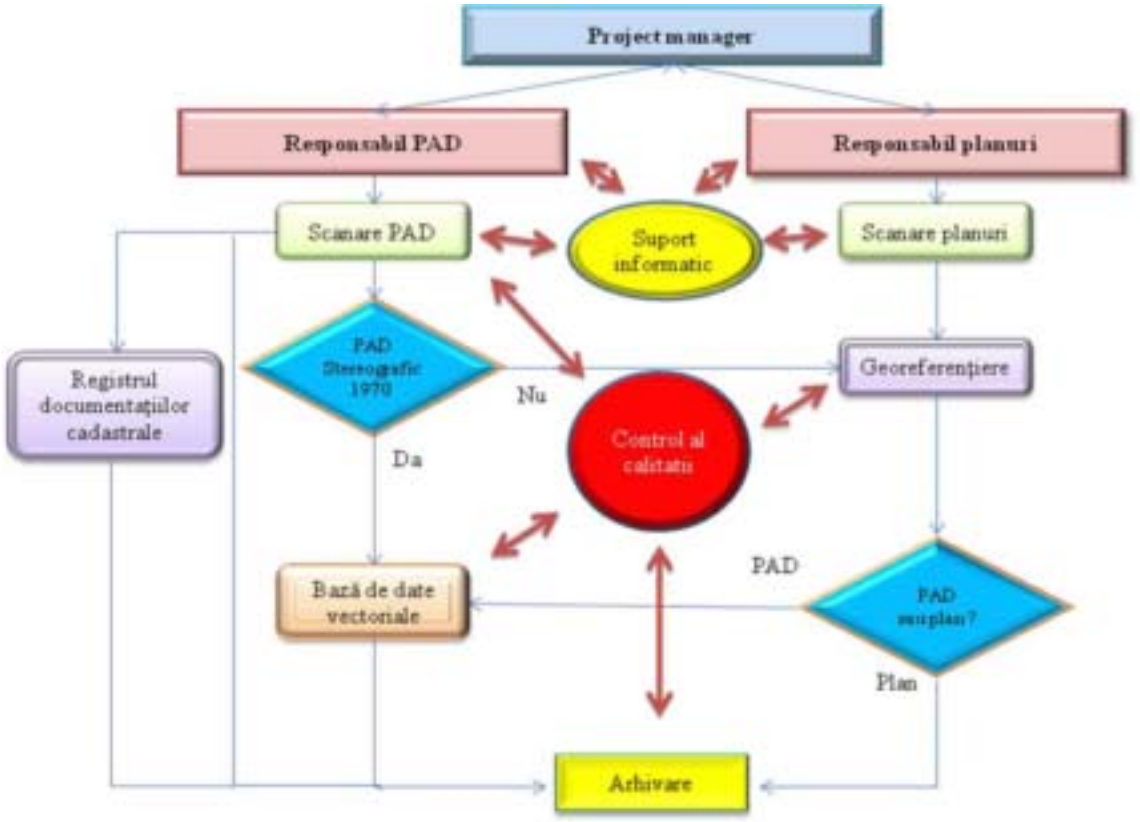

Fig.1. The project diagram

V. The multiple-criteria analysis

A criterion is a clear and well-defined point of view of the specialist in this field through which the specialist (alone, or in a team) limits, individuates and defines certain properties, characteristics, features that pertain to the analyzed object.

The most important criteria must be indentified (since these criteria are several, the analysis itself is called multiple criteria) and only in this way a relevant and unambiguous analysis can be carried out.

It is recommended that finding and choosing the criteria of a multiple criteria analysis should be done in one or two sessions of Brainstorming.

4 criteria have been taken into account for the multiple criteria analysis and they are:

1. The cost (C)
2. The performances (P)
3. The time for getting the results (T)
4. The adaptability (A)

Determining the weight of each criterion:

The calculation of the weight ratios:

$$\gamma_i = (p + A_p + m + 0{,}5)/(- A_{p'} + N_{crt}/2) \quad (1)$$

In which:

p – is the sum of (linear) points obtained by the element taken into account ;

Ap –the difference between the points of the element taken into consideration and the points of the element from the last level; if the element taken into account is the very one situated on the last level, then *Ap* has 0 value;

m – the number of sub-classified criteria (surpassed in the number of points by the criterion taken into account);

N_{crt}- the number of criteria taken into consideration;

Ap –the difference between the points of the element taken into account and the points of the first element (resulting in a negative value); if the element taken into account in on the first level then Ap has 0 value.

Determining the weight of each criterion:

$$y_1 = \frac{P + AP + m + 0.5}{- AP' + \frac{Ncrt}{2}} = \frac{3,5 + (3,5 - 0,5) + 3 + 0,5}{-(3,5 - 3,5) + 2} = 5 \quad (2)$$

$$y_2 = \frac{P + AP + m + 0.5}{- AP' + \frac{Ncrt}{2}} = \frac{2,5 + (2,5 - 0,5) + 2 + 0,5}{-(2,5 - 3,5) + 2} = 2.33 \quad (3)$$

$$y_3 = \frac{P + AP + m + 0.5}{- AP' + \frac{Ncrt}{2}} = \frac{1,5 + (1,5 - 0,5) + 1 + 0,5}{-(1,5 - 3,5) + 2} = 1 \quad (4)$$

$$y_4 = \frac{P + AP + m + 0.5}{- AP' + \frac{Ncrt}{2}} = \frac{0,5 + (0,5 - 0,5) + 0 + 0,5}{-(0,5 - 3,5) + 2} = 0.20 \quad (5)$$

TABLE.1

	C	**P**	**T**	**A**	**Points**	**Level**	**Yn**
C	0,5	0	1	1	2,5	2	2,33
P	1	0,5	1	1	3,5	1	5
T	0	0	0,5	1	1,5	3	1
A	0	0	0	0,5	0,5	4	0,20

Identifying all variants

The land location and demarcation plans (PAD) as well as the topographic and cadastre plans (PTC), land plot plans (PP) can be of the following types:

a) Type A PAD- The land location and demarcation plans carried out by using the 1970 stereographic system of coordinates;

b) Type B PAD- The land location and demarcation plans carried out by using other systems;

c) Type A PTC and PP-topographic and cadastre plans which allow for direct geo-referencing (there is a frame or a rectangular grid);
d) Type B PTC and PP-topographic and cadastre plans which do not allow for direct geo-referencing (it is necessary to identify some linking points).

In order to achieve this project it is necessary to geo-reference and scan these types of land location and demarcation plans which is the most thorough from the point of view of its elaboration and the technical data contents.

Assigning an "N" mark

An "N" mark –called "grade of importance" or "grade of contribution" is assigned –which must be a full number (maximum grade 10). The grade is assigned to each variant according to each criterion.

TABLE 2

	Var 1 PAD Type A	**Var 2 PAD Type B**	**Var 3 PTC and PP Type A**	**Var 4 PTC and PP Type B**
Criterion	**Ni**	**Ni**	**Ni**	**Ni**
C	**9**	**8**	**8**	**6**
P	**10**	**4**	**8**	**6**
T	**10**	**4**	**8**	**5**
A	**9**	**5**	**9**	**7**

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Calculating the results of the "N" marks and the weight ratios

This calculation is done in a table called the *matrix of consequences*.
The sum of these results will be calculated, sums (usually unique values, associated to each variant) which will set the final classification.

TABLE 3

		Var I		**Var II**		**Var III**		**Var IV**	
Crit	**Y**i	**Ni**	**Ni* Y**i	**Ni**	**Ni* Y**i	**Ni**	**Ni* Y**i	**Ni**	**Ni* Y**i
C	**2,33**	**9**	**20,97**	**8**	**18,64**	**8**	**18,64**	**6**	**13,98**
P	**5**	**10**	**50**	**4**	**20**	**8**	**40**	**6**	**30**
T	**1,00**	**10**	**10,00**	**4**	**4**	**8**	**8**	**5**	**5**
A	**0,20**	**9**	**1,80**	**5**	**1**	**9**	**1,80**	**7**	**1,40**
Final Classification			**82,77**		**43,64**		**68,44**		**50,38**

VI. Conclusion

As a result of the above calculations it can be seen that Variant I is the best, as it necessitates a lower cost, a higher degree of accuracy and it does not involve too many operations in what concerns their scanning and geo-referencing.

VII. Bibliography

The main regulations in this field have been the following:

- No. 452/1999 Ordinance of the President for the National Office of Cadastre, Geodesy, and Cartography concerning the sanction of the Technical Norms for the introduction of the general cadastre;
- No. 1330/c/1999 Ordinance of the Minister of Justice regarding the founding of land books with a non-final character;
- No.946/2000 Ordinance of the President for the National Office of Cadastre, Geodesy, and Cartography concerning the sanction of the Instruction for the elaboration of technical cadastral documentation necessary for the non-final registration in the Land Book of the juridical deeds and facts concerning land tracts and constructions;
- No. 534/2001 Ordinance of the Minister for Public Administration regarding the sanction of the Technical Norms for the introduction of the general cadastre;
- No. 61/2002 Ordinance of the Minister for Public Administration concerning the sanction of the Methodological Norms regarding the procedures for informing, contracting , paying and appointing physical or legal persons authorized to execute technical documentations necessary for the drawing up of the land book and the real-estate publicity;
- No. 93/2004 Ordinance of the President for the National Office of Cadastre, Geodesy, and Cartography concerning the modification of the instructions for the drawing up of the technical cadastral documentation necessary for the non-legal registering in the Land Book of the juridical deeds and facts concerning land tracts and constructions;
- No. 634/2006 Ordinance of the General Manager of the National Agency for Cadastre and Real-Estate Publicity regarding the sanction of the Regulation for the contents and the method of drawing up cadastral documentations necessary for the registration in the Land Book.