Digitization of Property Index Maps: One Step towards GIS Standards in Albania

By

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October 2000*

"In today's world of increasing ubiquity of digital information, standards are means of ensuring its benefits".

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ABSTRACT

The introduction of Albania to market-oriented economy has been associated with a rapid increase in the amount of information created to support the existing and newly created institutions. Albanian institutions, although faced with financial limited resources, are generating new data required by their new roles in society. Large amounts of data are originated by many donor-funded projects implemented in Albania. In addition, the private sector is becoming an important player not only for data processing but data capturing as well. In most cases, this information is created in digital form. However, while the amount of the data has been rapidly increasing, often these initiatives have been uncoordinated. Therefore, there has been a lack of intentions on designing standards that would make the data more valuable in the long term. This paper presents a description of the map digitization process involved in the creation of the Immovable Property Registration System (IPRS) as an example of introducing standards as a means of improving production, quality control, and increasing the potential for data sharing. Although we are conscious of the large variety of digital information different institutions in Albania will create in the future, this paper serves as a call for all institutions to consider the important issues of standards before getting involved in any project with investments made in creating digital data/information.

1. INTRODUCTION

The global trend towards digital information has been unavoidable for Albanian institutions as well. Although with much slower speed compared to their western counterparts, Albanian institutions are experiencing extensive development of digital information systems. The market-oriented economy requires new players, for whom information becomes one means of survival in such a competitive environment. Public institutions and private sector have already recognized the specifics of this new environment and are working hard to find their unique place in the market. However, due to lack of experience, immediate interests of short-term nature, changing levels of market insecurity, and other factors, we often observe this process has shown to be sporadic, with limited integration and coordination.

Geographical Information (GI) community in Albania soon will be facing difficult problems resulting from the lack of coordination of efforts and good documentation of data and information generated. Also, there has not been so far any initiative in the creation of information standards in Albania. In this paper we provide a description of digitizing work performed in the Project Management Unit (PMU) for the Immovable Property Registration System (IPRS), with the intention to provide an example of how the work on documenting the information and establishing standards was conducted. Although these standards might sound specific to the IPRS, we argue that some of these standards could also be used by other GI entities in Albania. The main purpose of this

paper is to enhance the awareness of GIS professionals on developing GI standards, in order to increase the efficiency and usage of data.

Finally, we provide some recommendations to the GIS community on steps to be pursued on developing policies at national, regional, or local level for the creation of information standards. We clearly argue for the benefits of GIS standards to all players involved, those being either producers or users of the GI systems.

2. BACKGROUND FOR PMU/IPRS

One of the largest and most important initiatives of Albanian Government after 1991 was the creation of the IPRS. Initial investigation visits from potential donors such as USAID and European Union successfully resulted in the design of an Action Plan for the creation of the IPRS, as the first step towards the development of Land Market in Albania. In February of 1994, the Project Management Unit (PMU) was founded, whose main objective was the fulfillment of the first registration of properties. The inventory of old properties and new properties created by different privatization programs were to be included in the registration system.

Most of the properties to be registered were created by the privatization programs. Albanian specialists and the foreign technical assistance decided to create a parcel-based system. The system would integrate both legal registration and mapping presentation of properties. Ordnance Survey from the U.K. provided technical assistance on the mapping side of the project through the funds granted by the European Union. The overall strategy was to use all mapping information that existed in Albania at the time. Due to high fragmentation of agriculture land after land privatization was conducted, the decision was taken to move from old map scale of 1:5,000 to 1:2,500 for agriculture areas. While the initial map enlargement was performed using photo-mechanical methods, later on, table digitization was used for enlargement. These enlarged maps were then given to surveyors, who were contracted for field surveying to update maps with information on the new properties.

A thorough analysis of costs and benefits concluded that accuracy required from Property Index Maps should be at levels of 1 meter for village maps and 0.3 meters for urban maps. Of course, in the future it is on the hands of the property owners to improve the measurements on their property. Maps will be on the Krassowski Ellipsoid using Gauss-Krueger projection. However, there are areas where a relative instead of absolute coordinate system has been used.

Another important decision was to develop the technology of producing digital maps. The process was associated with usual difficulties of the beginning, however people are now convinced on the benefits of having the mapping information on immovable properties in a digital form. Different ways of producing digital maps are the subject of the next section.

The final results of all mapping activities at the PMU would be the Property Index Map. While a scale of 1:2,500 was used for rural areas, 1:1,000 and 1:500 was found appropriate for the presentation of properties in the cities and urban areas of villages. In total there will be 9,000 map sheets at scale 1:2,500 for rural areas and 3,000 map sheets at scale 1:1,000 or 1:500 for urban areas. To date of this paper about 80% of maps are finished.

3. DIGITAL MAP INFORMATION WITHIN IPRS

Preparation of the digital property index maps was one of the objectives of the information system strategy developed for the IPRS. Map production was not considered as the only end goal of mapping activities. Instead, many efforts were devoted to the education and training of specialists in developing skills on dealing with modern mapping technologies. Therefore, different techniques were applied on producing the property index maps, which resulted in the creation of a series of digital information. A list of different kinds of this information follows:

a. Digital information created by total station measurements. During 1995, about 1,200 control points were measured to support the processing of air photographs taken in 1994 and 1999. The coordinates of these points are within an average quadratic error of ±20cm. PMU has rented out its 4 total stations, which have a relative error in length measurements of 1/300,000. All measurements are documented and filed near the photogrammetry sector.

b. Digital property index maps created from the processing of the air photography of 1994 and 1999 using analytical stereo-plotters. The air photography covered reciprocally about 4,000 Km^2 and 3,200 Km^2, mainly in the western coastal area of Albania. These maps are mainly in the scale 1:2,500 and 1:1,000. By mid 2000, about 50% of the parcel index maps have been produced from base maps prepared by the photogrammetry sector of the PMU.

c. Digital property index maps created by digitization of the old existing maps in scale of 1:5,000. These maps were used as base maps during field survey and updating for generation of property index maps, which include the boundaries of the new properties created by land privatization. Different entities were contracted to produce about 5,500 map sheets, which are delivered and filed in AutoCAD DWG format at the Geomatics sector of the PMU.

d. Digital property index maps through digitization of the hand-drawn maps at scale 1:2,500 taken from the field survey contractors. During 1997, the PMU's specialists in cooperation with foreign technical assistance prepared the standards of digitization of property index maps, which provide the rules and procedures for the quality control of maps. In the next section (and in Appendix A) we present more detailed information on these standards. The digitization process started in 1998 and the work was contracted to different private companies. Until now about 800 cadastral zones have been digitized, delivered, and archived at the Geomatics sector of the PMU.

e. Digital information created by GPS measurements. GPS equipment was first installed at PMU in December 1996 by Corvallis Micro Technology. One base station has been installed on the roof of the Land Research Institute in Tirana, which then communicates with another available base stations and 9 (nine) rover units. These control point measurements were performed to assist in the transformation of maps from local to state coordinates, support the new field surveying, air photography, and analytical and orthophoto mapping. Measurements have been contracted to individual surveyors and now PMU has about 3,000 control points in its archive.

f. Digital property index maps produced by digital photogrammetry methods (orthophoto) using air photographs of 1994 and old photographs from the Military Topographic Institute. Orthophoto has served both the creation of the property index maps and generation of a background image to be used as a controlling method on the accuracy of the maps. This production line has been in an experimental phase. However, considerable experience has been collected, which could help on correcting errors in the digital database.

In the following sections we describe in detail the map digitization process, rules, and standards that have been developed for this process.

4. DIGITIZING PROPERTY INDEX MAPS

While there are many advantages on having digital rather than hand-drawn maps, the main purpose of digitization of property index maps has been to allow for quality control and linkage of geographical position of a property with the descriptive legal data kept in the Kartela of that property. Such linked information will then serve as one of the important layers of most of future geographical information systems in Albania.

The first step of using the digitization technique for the PMU/IPRS was related to the enlargement of the original 1:5,000 cadastral maps to produce maps of 1:2,500. Few opinions within the project showed tendencies of monopolizing the digitization process and conduct it internally at the PMU, using full-time state-paid employees. However, the decision was made to outsource the digitization work to private companies and other state entities, with payment related to the quantity and quality of the deliverables. Digitization capacities in the country were very limited and only few companies were involved in the process.

In 1998, the PMU started to contract private companies for digitizing hand-drawn maps that surveying companies delivered to the project, after the first registration was finished. The process of digitizing the property index maps was even more regularized and standardized after a good cooperation of Albanian specialists and Technical Assistance from the European Union provided to the PMU. A set of standards was designed, which have been used since then and have already proved to significantly improve the quality of the maps and ease the digitization process.

Following we have presented the steps of the digitization process:

a) Surveyors go to the field to either update existing maps or create new ones with new boundaries of properties. The hand-drawn maps are delivered to the PMU coordinator in the district.
b) The coordinator brings the paper maps to the PMU digitization sector.
c) The PMU digitization sector takes the paper maps to the contracted digitizing companies/entities.
d) The company digitizes the map precisely as it has been hand-drawn by the surveyor and prints a temporary copy of the map of that cadastral zone. Because of the potential mistakes during the hand-drawing process, the company also prepares a list of these mistakes presented in a standardized way, ready for the coordinator and his surveying contractor to correct them.

e) These maps are taken to the coordinator, who manages to correct all the mistakes with the assistance of the surveying contractor that performed the work.
f) Then the company makes the corrections again in computer and delivers the work at the PMU digitizing sector.
g) The PMU digitizing sector performs the quality control procedures to make sure that no errors appear in the digitized maps delivered.

Although the steps described above consist of almost common-sense steps to follow, we stress the importance of the following actions, especially in the cases of the projects where a massive digitization work is performed for the first time:

a) Creation by the digitizing company of a temporary printed map to be used for further corrections;
b) Creation by the digitizing company of a standardized list of mistakes with clear instruction on how to correct them;
c) Creation of clear quality control procedures to be applied by the PMU digitizing sector to the digitized maps that the company delivers.

During 1999, a new contract was designed that required from surveying companies to deliver the maps in a digital format.

5. DIGITIZATION STANDARDS

While we have presented full description of cadastral mapping metafile structure in the Appendix A, in this section we list a series of standards used in the digital property index maps and also provide the reasons why these standards could easily be included in digitizing process of most maps in different projects in Albania. The use of such standards would help Albanian institutions to easily share their information when need arises.

For each layer we specify:

- Layer description;
- Main attributes (color and line type);
- Characteristics of its entities;
- Line type or text type;
- Color of different features in the layer;
- Rules for data input;
- Special remarks for elements laying on the boundary of the sheet.

a. Layer BORDER_C

Description: This layer contains the sheet corners, defined as circles centered to the map vertices.

All map sheets have four corners. Therefore, as a common characteristic of any map, we would call for this standard to be used by any producer of digital maps. Minor changes may be needed based on the scale of the map.

b. Layer BORDER_L

Definition: This layer contains the border of the sheet, which is a closed polygon joining the map vertices.

All map sheets have the limiting boundary of the map in the shape of a rectangle (polygon). Therefore, as a common characteristic of any map, we would call for this standard to be used by any producer of digital maps. Minor changes may be needed based on the scale of the map.

c. Layer BORDER_T

Definition: This layer contains the sheet name [i.e. "K-34-100-(164-A)"]

All map sheets have a sheet name according to Albanian codification standard for map sheets based on the scale of the map. This standard provides rules of writing this sheet name on a map sheet. Therefore, as a common characteristic of any map, we would call for this standard to be used by any producer of digital maps.

d. Layer PARCEL_L

Definition: This layer contains all and only lines which are limits of parcels.

Maps serving different purposes might have different features presented as polygons, as is the case of parcels on a cadastral map. However, we consider this standard could also be used to represent those features. Here it is important to understand the entry rules and border rules from the standard described in the Appendix A. Minor changes might be required based on the kind of map features that are being digitized.

e. Layer PARCEL_T

*Definition: This layer contains the "number" of each parcel inside the cadastral zone. When the text containing the number is positioned outside the parcel, on the source map (because of its dimensions), the insertion point of the text **must be** positioned inside the parcel, also if the dimension of the text overlap the other parcels.*

While in the case of property index maps the label represents the property number, we expect that in other kind of maps polygons might have a number (code, text) to identify that feature. Therefore, we recommend this standard to be used in all cases that a polygon will need to be identified with a number.

f. Layer PARCEL_S

Definition: This layer contains the symbols referred to parcels indicating some of its characteristics (use of soil, condition etc.) and hidden segments to connect symbol positioned outside their parcel.

We consider this layer very important and recommend to be used by all map producers, because this will ease the process of reading and understanding any map coming from different producers. In the standard presented in Appendix A one could find some of the symbols used in the property index maps, but we encourage that list be extended and for different producers to agree on using the same symbols for representing different features.

g. Layer BUILDING_L

Definition: This layer contains only lines, which are limits of a building and are not limits of a parcel, cadastral zone or sheet border.

We expect that most maps will have to present the buildings in an area. As a common characteristic of most of the maps, we consider any producer of digital maps could use entry and border rules presented in the standard, when building features are involved.

h. Layer SECONDARY

Definition: This layer contains all the lines, which have a topographic interest but are not boundary of parcels and buildings.

In our standard we have used the color to represent different topographic features on a map (see Appendix A). While we would encourage producers of digital maps to use the same colors, we also realize that for different needs producers might want to use other colors. However, it is important that whatever colors have been used to represent different topographic features, they should be well documented with the digital map being produced.

In the case of property index maps, we have designed precise standards for file naming. The digitized map delivered by the digitizing company is based on a cadastral zone, i.e. we have one file for each cadastral zone. The rules for naming these computer files are presented in the Appendix A. Although we realize the specificity of such rules for property index maps, we encourage the development of rules for naming the files in any creation of databases.

Finally, we would like to stress the importance of good documentation of rules followed for the creation of any kind of digital mapping information. We realize that for the moment it might be hard for all institutions and private businesses in Albania to coordinate their efforts in using the same standards in their digital maps. However, at least it would help these institutions if they document well enough information on file structures, formats, naming rules, of the digital information they provide, in order for the potential users of that information to easily find the data and information they need.

6. POLICY RECOMMENDATIONS

The creation of GIS systems should be considered in conjunction with the overall national policy on information systems. Based on experiences of many other countries, either developed or undeveloped, we call for the creation of a National Information Infrastructure Agency. Of course, this will require the involvement of government policy makers and the participation of the private sector. We recognize current involvement of the Government with an immense amount of problems affecting the immediate needs of population. However, we consider issues related to information systems in Albania to be important for current and future Albania.

In order to increase the awareness of GIS community on the importance of developing the right policies for information standards, we consider the creation of the Geomatic Association as an important means for achieving desired results. The objective of the establishment of the Association is to improve the coordination of activities related to Albanian Geo-Information community. Potential duties of the association would be:

- Coordinate efforts of Albanian public or private institutions related to the GI;
- Support the representation of interest of members of association in the field of GI;
- Create contacts with similar associations of other countries;

- Support the design of legal policies for the GI;
- Develop strategies for confirming the benefits of all GIS players from data sharing;
- Increase awareness on the importance of GI in the Albanian context;
- Coordinate potential international aid provided to GI community;
- Support the creation of a GI metadata system;
- Compile recommendations resulted from Geo-Information applications from different Albanian institutions;
- Cooperate with Albanian Universities to find the proper demand-supply equilibrium for professionals in the field of GI.

The third initiative would be to create as soon as possible rules and standards for the creation of a metadata system to document all the information that exists in Albania in the field of the GIS. This inventory of the databases that have been created or are in creation should be considered as a means that serves interests of both data producers (sellers) and data users (buyers). Therefore, we expect all data producers, public entities or private companies to participate and support this initiative.

While these recommendations might prove hard to implement, we think that it is time for the GI Albanian community to start pushing these initiatives ahead. It is the duty of this community to make Albanian public aware of the importance of well-thought GI systems.

Appendix A. Cadastral mapping metafile structure

Source of information:

MINISTRY OF AGRICULTURE AND FOOD
on behalf of
THE GOVERNMENT OF ALBANIA
PHARE PROGRAMME

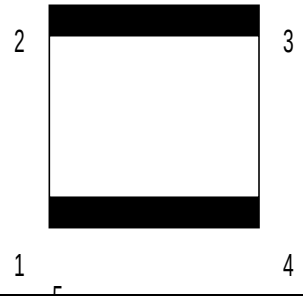
Technical Assistance for Survey and Mapping
for the Immovable Property Registration System
Project Number : AL 94 03 02 02 L002

Data are structured according to the Technical Specifications issued by IPRS-PMU. Hereafter are reported the main characteristics of data as per the last version of Specifications. Parcel and building are presented in the metafile structure as lines. The polygons of parcels and buildings residing on more than one sheet are totally repeated, with the same coordinates, in each sheet. When lines on the border are mismatching, such situations are marked with symbols and then saved in a special layer (MATCH). The information of the parcel number is given through a layer of texts. Different features, which belong to the same layer (for ex. different kind of lines that bound a parcel) are in general distinguished through their color or their font.

For each layer are specified:
- description;
- main attributes (color and line type);
- characteristics of its entities;
- line type or text type;
- color of different features in the layer;
- rules for data input;
- special remarks for elements laying on the boundary of the sheet.

The following tables describe the version of the structure of the DXF metafile.

Name	BORDER_C
LineType	CONTINUOUS
Colour	1
Description	This layer contains the sheet corners, defined as circles centred to the map vertices.
Entities	Entity type is CIRCLE.
Features	
Entry rules	Radius: scale 1:2500 100 [m] scale 1:1000 40 [m] scale 1:500 20 [m]
Border rules	

Name	BORDER_L
LineType	CONTINUOUS
Colour	0
Description	This layer contains the border of the sheet, that is a closed polygon joining the map vertices.
Entities	Entity type is POLYLINE.
Features	BYLAYER BYLAYER border line
Entry rules	The points of the polygon must be inserted in the order showed below: 
Border rules	

Name	BORDER_T
Description	This layer contains the sheet name [i.e. “K-34-100-(164-A)”]
Style	ROMANT.SHX
Colour	0
Entities	Entity type is TEXT
Features	It is present only one feature: scale height rotation angle 1:2500 37.5 [m] 0 1:1000 15.0 [m] 0 1:500 7.5 [m] 0
Entry rules	The insertion point must be placed inside the polygon. If the code is not present on the map but indicated outside the border, the code must be placed inside the polygon in central position.
Border rules	

Name	CZONE_L
Description	This layer contains all and only lines which are limits of cadastral zones.
LineType	CONTINUOUS
Colour	0
Entities	Entity type is always LINE or POLYLINE.
Features	Features are distinguished trough the colour according to the following list: Hierarchy Line type colour feature 1 BYLAYER 4 *limit of building* 2 BYLAYER 5 *railways* 3 BYLAYER 3 *limit of road* 4 BYLAYER 2 *water limit* 5 BYLAYER 6 *slope* 6 BYLAYER BYLAYER *generic parcel limit*
Entry rules	Lines must be entered using snap functions to assure the absolute geometric coincidence of nodes. When using polylines nodes must be present in every intersection. If the cadastral zone contains the whole sheet, the sides must coincide with the border.
Border rules	Segments on the border must be entered with colour 1. Only one segment has to be digitized between the edge of the sheet and the boundary of the zone. Points residing on the border must be obtained snapping on the limit of the sheet (i.e. they must lie on the border).

Name	CZONE_T
Description	This layer contains the codes of cadastral zones
Style	ROMANT.SHX
Colour	0
Entities	Entity type is TEXT
Features	It is present only one feature: scale height rotation angle 1:2500 37.5 [m] 0 1:1000 15.0 [m] 0 1:500 7.5 [m] 0
Entry rules	The insertion point must be placed inside the polygon, in the same position of the source map. If the code is not present on the map but indicated outside the border, the code must be placed inside the polygon in central position.
Border rules	

Name	PARCEL_L
Description	This layer contains all and only lines which are limits of parcels.
LineType	CONTINUOUS
Colour	0
Entities	Entity type is LINE or POLYLINE.
Features	Features are distinguished trough the colour according to the following list: Hierarchy Line type colour feature 1 BYLAYER 4 *limit of building* 2 BYLAYER 5 *railways* 3 BYLAYER 3 *limit of road* 4 BYLAYER 2 *water limit* 5 BYLAYER 6 *slope* 6 BYLAYER BYLAYER *generic parcel limit*
Entry rules	Lines must be entered using snap functions to assure the absolute geometric coincidence of nodes. When using polylines nodes must be present in every intersection
Border rules	Only the lines residing inside the sheet must be entered. Points residing on the border must be obtained snapping on the limit of the sheet (i.e. they must lie on the border).

Name	PARCEL_T
Description	This layer contains the "number" of each parcel inside the cadastral zone. When the text containing the number is positioned outside the parcel, on the source map (because of its dimensions), the insertion point of the text ***must be*** positioned inside the parcel, also if the dimension of the text overlap the other parcels.
Style	ROMANT.SHP
Colour	0
Entities	Entity type is TEXT.
Features	*scale* *height* *rotation angle* 1:2500 5.0 [m] in accordance with the parcel shape 1:1000 1.5 [m] 0 1:500 0.75 [m] 0
Entry rules	The number of the parcel must be entered for every element of the sheet. The position of text must be as similar as possible to the position on the source map, justifying the writing in the proper way. Horizontal texts must be placed with one point and oriented texts with two points. In any case the insertion point must be inside the parcel.
Border rules	

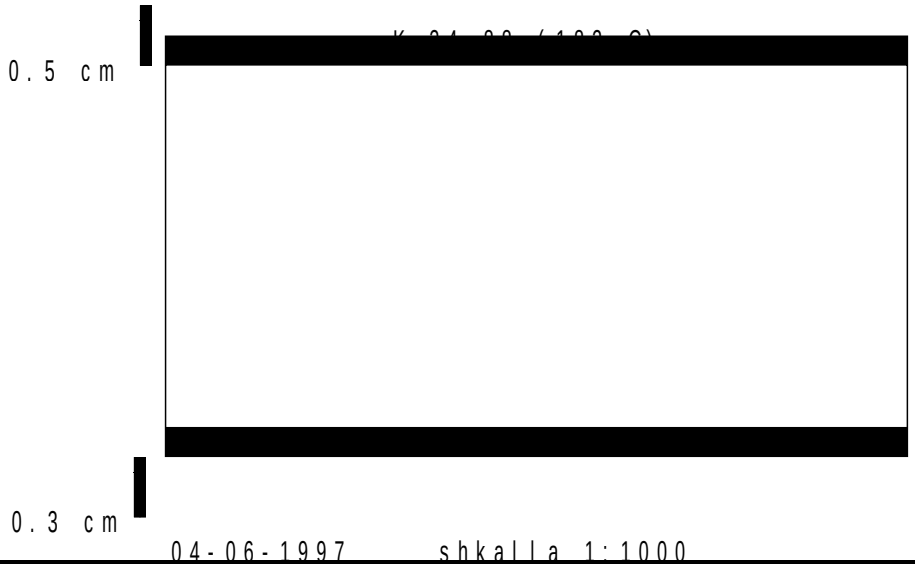
Name	PARCEL_S
Description	This layer contains the symbols referred to parcels indicating some of its characteristics (use of soil, condition etc.) and hidden segments to connect symbol positioned outside their parcel
Style	SYMATH or SYMAP (see Features description)
Colour	0
Entities	Entity type is TEXT for symbols and LINE for the connecting lines.
Features	TEXT: ***Height*** ***Style*** ***Letter*** ***Feature*** *scale 1:2500* 12.5 [m] SYMATH "a" *direction of rivers, channels etc.* 7.5 [m] SYMAP "c" *forests* 5.0 [m] SYMAP "~" *parcel/building link* *scale 1:1000* 5 [m] SYMATH "a" *direction of rivers, channels etc.* 3 [m] SYMAP "c" *forests* 2 [m] SYMAP "~" *parcel/building link* *scale 1:500* 2.5 [m] SYMATH "a" *direction of rivers, channels etc.* 1.5 [m] SYMAP "c" *forests* 1.0 [m] SYMAP "~" *parcel/building link*
Entry rules	The position and orientation of symbols must be as similar as possible to the position on the source map.
Border rules	The symbol must lay entirely inside the sheet boundary.

Name	BUILDING_L
Description	This layer contains only lines which are limits of building and <u>are not</u> limits of parcel, cadastral zone or sheet border.
LineType	CONTINUOUS
Colour	4
Entities	Entity type is LINE or POLYLINE.
Features	
Entry rules	Lines must be entered using snap functions to assure the absolute geometric coincidence of nodes. When using polylines nodes must be present in every intersection.
Border rules	Only lines residing inside the sheet must be entered. Points residing on the border must be obtained snapping on the limit of the sheet (i.e. they must lie on the border).

Name	SECONDARY
Description	This layer contains all this lines which have a topographic interest but are not boundary of parcels and buildings.
LineType	CONTINUOUS
Colour	0
Entities	Entity type is LINE or POLYLINE.
Features	Features are distinguished trough the colour according to the following list: Hierarchy Line type colour feature 1 BYLAYER 4 *limit of building* 2 BYLAYER 5 *railways* 3 BYLAYER 3 *limit of road* 4 BYLAYER 2 *water limit* 5 BYLAYER 6 *slope* 6 BYLAYER 8 *high tension power lines*
Entry rules	
Border rules	Points residing on the border must be obtained snapping on the limit of the sheet (i.e. they must lie on the border). Lines must match with the correspondent elements on adjacent sheet both from geometry and feature point of view; points on the border can be moved from their original position on the layer within tolerances.

Name	TOPONYMS
Description	This layer contains all different toponyms present on the maps. Different heights and colours are used for different kinds of texts. The style of texts is STANDARD. The toponyms indicating the presence of towns must be in capital letters.
Style	ROMANT.SHP
Colour	0
Entities	Entity type is TEXT.
Features	*Scale 1:2500* 12.5 [m] BYLAYER *town* 10.0 [m] BYLAYER *village* 10.0 [m] 2 *river* 7.5 [m] BYLAYER *national road* 6.0 [m] BYLAYER *street* *Scale 1:1000* 5.0 [m] BYLAYER *town* 4.0 [m] BYLAYER *village* 4.0 [m] 2 *river* 3.0 [m] BYLAYER *national road* 2.5 [m] BYLAYER *street* *Scale 1:500* 2.5 [m] BYLAYER *town* 2.0 [m] BYLAYER *village* 2.0 [m] 2 *river* 1.5 [m] BYLAYER *national road* 1.2 [m] BYLAYER *street*
Entry rules	The position of toponyms must be as similar as possible to the position on the source map. You will use one point to place horizontal texts and two point to place oriented texts.
Border rules	The toponym must lay entirely inside the sheet boundary.
Name	GRID
LineType	CONTINUOUS
Style	ROMANT.SHX
Colour	0
Description	This layer contains all texts and lines which describe the geographic, plane reference grid of

	the map.
Entities	Entity type are TEXT, LINE or POLYLINE
Features	TEXT: ***Height*** ***Style*** ***Colour*** ***Feature*** 2 mm on scale BYLAYER BYLAYER text of vertex 1.5mm on scale BYLAYER BYLAYER text on border side LINE: ***Line type*** ***colour*** ***feature*** BYLAYER BYLAYER cross BYLAYER BYLAYER dash
Entry rules	The grid must be automatically generated following the rules deduced from the source map.
Border rules	

Name	DESCRIPTIONS
Style	ROMANT.SHP
Colour	0
Description	This layer contains texts positioned around the border, indicating: 1) the number of the sheet obtained by 1:1000000 sheet code + 1:100000 sheet code + source map code (for example K-34-88-(182-C)). 2) the source scale of the map 3) the date of the automatic map delivery
Entities	Entity type is TEXT
Features	*Height Colour Feature* 1.5 cm BYLAYER sheet number 0.5 cm BYLAYER scale 0.4 cm BYLAYER date
Entry rules	The writings must be placed in the following standard positions: 

Name	MATCH
Description	This layer contains the symbols to indicate the mismatch of lines on the border. Different colours are used for the three different coverages of cadastral zones, parcels and buildings.
Style	SYMAP.SHX
Colour	0
Entities	Entity type is TEXT.

Features	TEXT: ***Height*** ***Colour*** ***Letter*** ***Feature*** *scale 1:2500* 15 [m] 1 "*" *cadastral zone.* 15 [m] 2 "*" *parcel of ownership* 15 [m] 3 "*" *building* *scale 1:1000* 6 [m] 1 "*" *cadastral zone.* 6 [m] 2 "*" *parcel of ownership* 6 [m] 3 "*" *building* *scale 1:500* 3 [m] 1 "*" *cadastral zone.* 3 [m] 2 "*" *parcel of ownership* 3 [m] 3 "*" *building*
Entry rules	The position of symbols must be "very close" to the point where the lack of match has been identified.
Border rules	

Data delivery

The name and extension of each file is defined by the following rules:

Scale	***FileName***	***Description***
1:2500	AXXXYYYB.TXT AXXXYYYB.DXF AXXXYYYB.LOG	A = "K" or "J", in accordance with the 1:1.000.000 sheet. XXX = number of 1:100.000 sheet. YYY= number of 1:5.000 sheet. B= "A", "B", "C" or "D", in accordance with the 1:2.500 sheet.
1:1000	JJKLXXYY.TXT JJKLXXYY.DXF JJKLXXYY.LOG	JJ = District code (i.e. "TR" for Tirana). KL =Two letters, in accordance with the ordinata of the 1:500 scheme (i.e. "PQ"). XXYY= Two number (four digits), in accordance with the abscissa of the 1:500 scheme (i.e. 0910).
1:500	JJKXX.TXT JJKXX.DXF JJKXX.LOG	JJ = District code (i.e. "TR" for Tirana). K = One letter, in accordance with the ordinata of the 1:500 scheme (i.e. "P"). XX = One number (two digits), in accordance with the abscissa of the 1:500 scheme (i.e. 09).

For every sheet three files are delivered:
1) A geographic file (extension .DXF) containing all the elements of different layers, according with the structure described above.

2) An ASCII text file (extension .TXT) composed by one record with the following structure:

Record	Description
Filename;ddmmyy;Firm	Filename = filename (with extension) Ddmmyy = date of the last updating of the source map Firm = Firm name (use always the same for each sheet of the same contract)

3) A diagnostic file (extension .LOG) containing:
- the orientation parameters, that is the orientation errors on each vertex of the sheet
- the number of closed parcel polygons
- the total surface of parcels

- the number of closed building polygons
- the total surface of buildings