Assistance System to the Issuance of Urbanism Authorizations (ASIUA) – Application to the Arzew City

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Key words: Acts of urbanism, Architecture 3-triers, GIS, ArcView 3.2, language Avenue.

SUMMARY

Some territorial collectivities endowed themselves since several years of Geographical Information Systems (GIS) that are used for the management of the urban space. If applications concerning transportation or environment are frequent, those having milked to the right of soils operational remain rare. Yet, it is about national instruction procedures, based on the standard geographical documents. The use of a GIS is therefore quite applicable to automate a part important of the notably cartographic administrative work. We chose to develop from ArcView®, an assistance system to the issuance of urbanism authorizations, in collaboration with services of urbanism and the habitat of the Arzew city (North-Western of Algeria). We are going to present you results of this work.

MOTS-CLÉS: Actes d'urbanisme, Architecture 3-triers, SIG, ArcView.3.2, Langage Avenue.

RESUME

Certaines collectivités territoriales se sont dotées depuis plusieurs années de Systèmes d'Information Géographique (SIG) qui sont utilisés pour la gestion de l'espace urbain. Si les applications en matière de transport ou d'environnement sont fréquentes, celles ayant trait au droit des sols opérationnel restent rares. Pourtant, il s'agit de procédures d'instructions nationales, basées sur des documents géographiques standards. L'utilisation d'un SIG est donc tout à fait pertinente pour automatiser une part importante du travail administratif notamment cartographique. Nous avons choisi de développer à partir d'ArcView® , un système d'aide à l'instruction des actes d'urbanisme, en collaboration avec les services d'urbanisme et de l'habitat de la ville d'Arzew (Nord-Ouest d'Algérie). Nous allons vous présenter les résultats de ce travail.

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1. INTRODUCTION

According to the legislative laws authorizations of urbanism constitute an authorized document family that is the Certificate of urbanism, the Permit to Construct, the Permit to Demolish, the Permit to Divide, the Certificate of Partition and the Certificate of Conformity.

It is the code of the urbanism that defines their role, their procedure of instruction and authorities authorized of their control and their deliverance. This authorized and legal context imposes an extremely strict whole of rules that milked as much to the progress of the procedure as to the respect of delays determined by the law and in force regulation.

Authorizations of urbanism have an objective duplicate: on the one hand, they allow the administration to make a follow-up, and on the other hand, they protect all appreciable territories aimed to the article 46 of the Official Algerian Newspaper [Art 46. 90-29].
The progress of the procedure of urbanism authorizations remained very heavy and services endure a lack of coordination.We identified the organizational weakness on which it was important to propose solutions:
   – Non uniformity of the procedure that is distributed on several autonomous services, what poses problems of communication and follow-up of files.
   – Data are little or not shared between the different services they endure a lack of consistency therefore and appropriate up to date especially for the treated by hand geographical data (loss of time) and under format paper (problems of stakes to the scale).

Facing these problems we propose solutions with two objectives :
   – Améliorer the security and the precision of treatments and so to decrease the legal risk hold in the decision.
   – The reduction of the necessary time for the different treatments in order to limit the number of files that passes the delay.

The use of a Geographical information System is therefore quite applicable to automate a part important of the notably cartographic administrative work.

2. LEVELS OF DECISION IN AN OPERATION OF INSTRUCTION OF URBANISM AUTHORIZATION

2. 1. Level of File Receipt and Deliverance of urbanism Acts

This level of decision represented in the case of the plain demands by the authority of the Local Popular assembly (APC) concerned.

2. 2. Level of urbanism instruction

This level of decision represented by the competent service charged of the instruction of the demand of urbanism authorization, for each township this level of decision presented by the Subdivision of Urbanism and Construction (SUC).

2.3. Outside opinion level

This level of decision represented by the public people, services or, if the case arises, of the association interested by the project, to the public people title [Article 39. 91-176] :

- The service of the state charged at the level of the urbanism of the wilaya.
- Services of the civil protection.
- The competent services of monuments and site, as well as of the tourism.
- The service of the state charged at the level of agriculture of the wilaya.

3. AN APPROACH FOR A SOLUTION

We chose to develop an approach below for the solution of these problems according to points:

1. The sharing of a GIS between the different services that use some geographical data will allow the service of urbanism to have the centralized information and of the regular procedures appropriate up to date. Its coupling on the one hand with a standard word processor presents the advantage to produce the letters type (receipt of deposit of the demand, letter of outside service opinion, decree finale), and on the other hand with a computer interface of different forms (Printed Official: Certificate of urbanism, Permit to construct, etc. …) gives an advantage to treat and to publish the different authorizations of urbanism in an automatic way.
2. Facing the fuzzy and to the complexity of texts that constantly evolves instructors are never safe from an oblivion. To avoid this type of mistake it is necessary to manage to clarify their general gait and their appraisal, in order to integrate him in a tool of help to the decision.
3. The distribution of the procedure in several independent services cannot be put back not completely in reason in a brutal manner without provoking dysfunctions bound to a deep reorganization of work. It is considered therefore in a first time to automate the communication while elaborating a computer tool of file follow-up.

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We are going to present the necessary data, the computer architecture kept for the development of a help system to the instruction of urbanism authorizations and in short to present the different application of it (modules) for every level of decision.

3.1. Data of the System

The necessary data to instruct an authorization of urbanism (Permit to construct, Permit to demolish, etc. …) are three types: Géoréférencées, Alphanumeric and Texts. Some as the land register, the PSO (Plan of Soil Occupation) and its regulation are used by several services and they must be therefore shared and updatings regularly. A trace be having to preserved of every operation, files will be integrated under numeric format in a special basis creates at the time of the development of the application.

3.2. Architecture of the System

We present a software architecture that defines functionalities of the different components and their use by the different levels of decision.
- A GIS permits the management of data géoréférencéeses and alphanumeric that representing the urban space. As all GIS, it's composed of a data base geographical and of a set of applications that permit: the creation and updating of data; the consultation and the exploitation of data through applications that do the spatial reasoning and that help the user in the decision making.
- A system of management of file of authorization demand: contains all relative information to demands and their statute of treatment.
- A system of document management: the instruction requires an important exchange of documents texts between the different levels of the urbanism instruction. This system permits a storage structured of these data and manage storage and rights of access of it. The architecture the most commonly used for this type of system is an architecture of 3 tièrses. it assures a separation between data and applications that exploit them permitting to have different views of a same data according to its use thus. Indeed, the first level of this architecture is constituted of data themselves, the second level is assured by a tool of data management, while the third will contain applications of consultation or modification that exploit data (§Fig. 1).
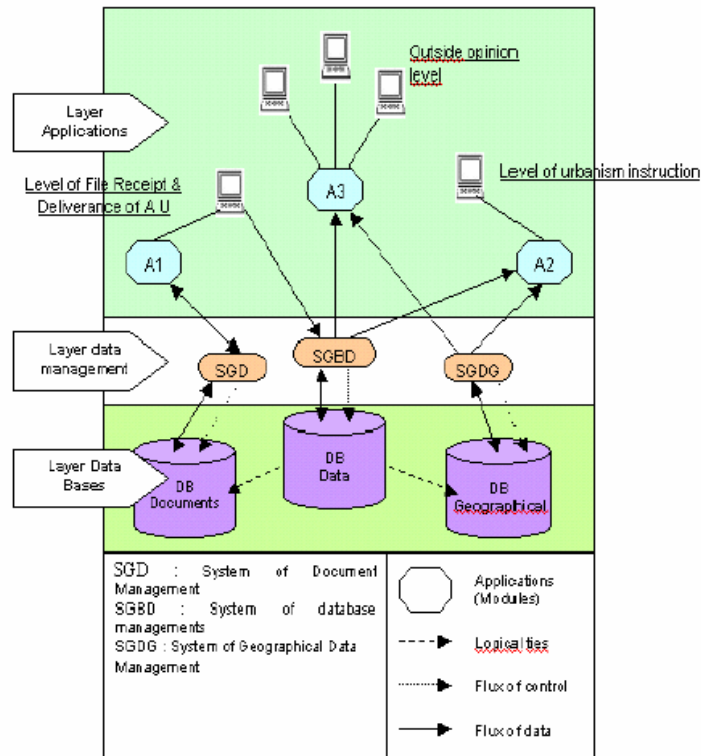
Fig. 1. Architecture 3-triers of an assistance system to the issuance

3.3. Modules of the System

Three modules are conceived and are presented in the chronological order in the process of the urbanism instruction.

3.3.1. Seizure of the request

A first module allows the seizure of all information present on the lawful printed paper form. Functions of checking of the coherence of the data were developed. All these raw data are recorded in the "Data base Requires" data bases Given (§Fig.1).

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Fig. 2. Interface of seizure of the request.

3.3.2. Urbanism Instruction

This second modules allows of assistance the instruction of town planning according to the general step and the expertise of the instructors of town planning, this module bases on seven functions :

- Consultation of request
- Research of the constraints
- Analysis of proximity
- Surface Constraints
- Consultation of the payment of the PSO
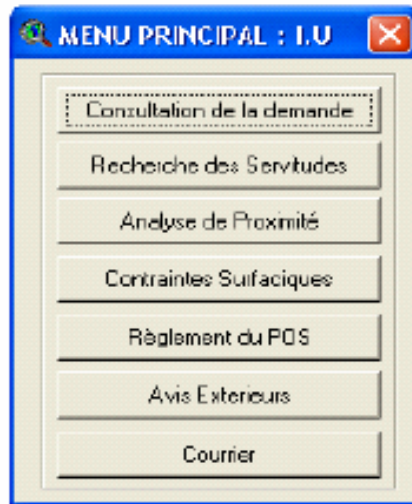- Consultation of the External Opinion
- Generation of the standard letter

Fig. 3. Urbanism Instruction

1. Consultation of the request: allows to see on an interface similar to the interface of seizure of the request, all information relating to the petitioner, work and the piece. Once information of the request validated, several scriptes of Avenue (programming language suitable for ArcView 3.2) intervenes:
   – A) To make a research in the geographical data base (the selected PSO) in order to find the parcel of the request (N° of the parcel).
   – B) A zoom on the found parcel, calculation of its surface and to indicate him to the center of its polygon.
   – C) The automatic display of the date of the instruction and transfers it direct of this information in the field concerned of the BD " DEMAND ".
2. Research of the constraints: this under - module permits to search for the existing servitude, near of the parcel (distance data) or directly on the concerned parcel (intersection). This submodule makes it possible to seek the geographical entities of one or more constraints selected using the piece found at the first stage of the validation of the request. This mode of research supports on one of the methods of space analysis of the GIS ArcView 3.2.
3. Analysis of proximity: the under - module of the proximity analysis permits to search for all loud themes that present the natural, picturesque, historic, cultural characters (to see Article 46. 90-29), basis on the same algorithm that the previous under - module.
4. Surface Constraints :
   – To control and check the surfaces declared on the request and that calculated of the geographical data base (surface of the piece, surfaces occupied and residual surface).
   – To calculate coefficients of ground (COS and CES) of the parcel concerned according to measured surfaces.
   – To calculate constructible surfaces.
   – The maximum height, the number of the levels .
5. Regulation of the PSO: in the case where the regulation of the PSO would exist this under - module permits to visualize it article by article according to the zone of the parcel concerned.

6. Outside opinion: permits to consult the opinion of every service or direction (Article 39. 91-176) concerned by petitioner's works, and to see the different observations and remarks on goes against it, the franchisee and works.

7. Mail: after the passage on the preceding submodules and the observation of the various results, this last submodule makes it possible on the one hand to the user to deliver his final opinion on the request for authorization of town planning, and on the other hand automatically to generate the lawful letter of exchange (ex: consultation on the request for permit building) between the APC and the service of town planning under format of electronic mail.
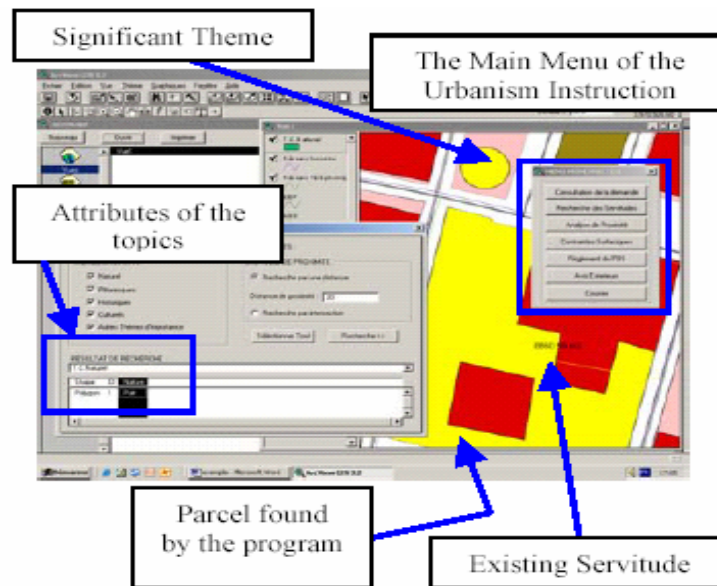

Fig .4. Research of the constraints & Proximity Analysis

3.3.3. Seizure of External Opinion

This last module allows the outside services that participate in the process of the instruction of the urbanism license in accordance with laws and in force regulation to give their opinions on the file. All opinions are recorded in data base Opinion " BD Data (§Fig.1).
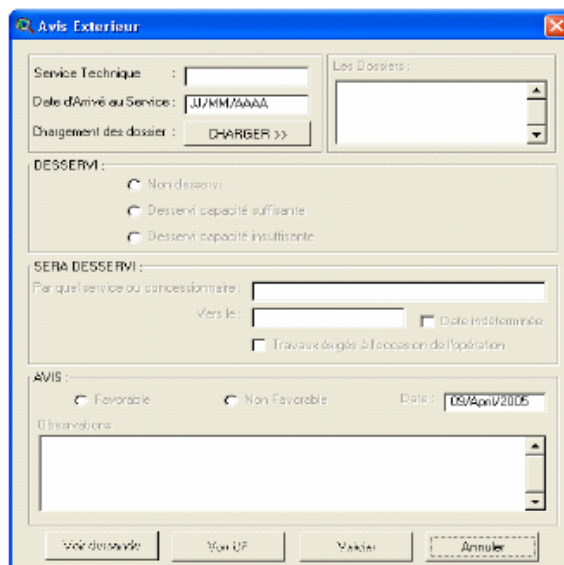
Fig .5. Interface of Seizure of External Opinion.

4. ORGANIZATION OF DATA OF THE ASIUA

The organization of data and their modelling rests on the traditional gait of instruction of urbanism authorizations. In this context, the data base (DEMAND) of our system (ASIUA) includes several entities, that are represented in the conceptual model of data under shape of tables: Tab - Authorization of urbanism, Tab - Petitioner, Tab - Parcel, Tab - Stage, Tab - Opinion, Tab – Works.

4. 1. Creation of the Geographical data base

In accordance with the Architecture 3-triers of the help system to the instruction of urbanism Authorizations (§Fig. 1), the creation of the geographical data base (DB Géographique) is indispensable for the gait of our conception, data of basis of this last are the one of the land register (boards and cadastral matrixes), of the PSO (zoning and regulation of the PSO or less some main features as the name of the zone, the value of COS and CES and a descriptive brief that indicates the essential points of the regulation), servitude, the protective zones of the urban architectural heritage and paysagers, zones of restricted advertisement, perimeters of building, the classified monuments, zones of excavations and zones of archaeological heritage.

Before their definitive storage and their use in our system the spatial data underwent pre - treatments: conversion of data structure, unification of the projection system and designation of themes (layers). Every BD Géographique is recorded under ArcView as being PSO project (*. apr) with or without regulation.

4. 2. Case of the Arzew city

The creation and the organization of data of the geographical BD of Arzew rests on the available data and the existing means in the setting of preparation of this work. The majority of data collected only covers the chief place of the township with the cover of the cadastral plan at 1/2000. The BD Géographique of Arzew includes several data, that are represented under shape of layers.

5. WORKING OF THE ASIUA

The objective of this work is to achieve a flat shape of interface of a help system to the instruction of urbanism authorizations that will function with the software GIS ArcView 3. 2 and that either completely independent of the zone or the PSO to treat. The call of ArcView and the opening of this project makes himself through this flat shape. Several coins system intervenes in the process of instruction of urbanism authorizations according to the level of decision chosen by the user (§Fig. 6).

5. 1. Starting of the ASIUA

The starting of the ASIUA is done from the helper Extension of ArcView, because our system is transferred in Extension " SIG-AUTOURBA " in order to give the possibility to distribute it on the three levels of decision.

5. 2. Choice of decision level and the PSO (*. apr)

The first module of our prototype system, it is the LEVEL OF DECISION module, the latter makes it possible to select one of the levels of decision according to the instruction urbanism authorizations process (§.2).

Fig .6. Level of decision.

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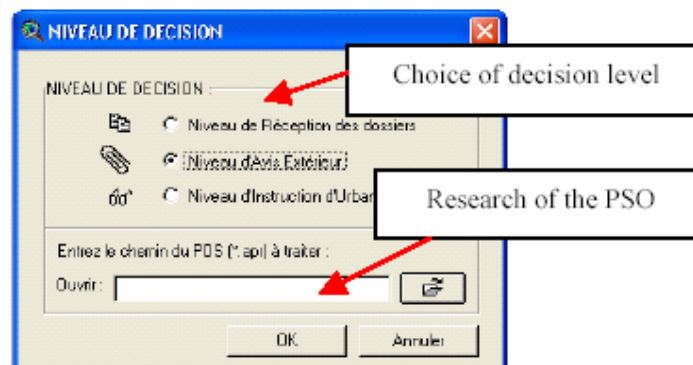
6. CONCLUSION

The contribution of this approach is the development starting from a core GIS of an operational application in right of the grounds. It can be thus integrated perfectly in the policy of division of the geographical data of the town of Arzew. A simple System of Rules was worked out automatically to inform the part "not blur" of the procedure. We obtained a saving of significant, reduced time the errors of treatment and thus increased legal safety in the decision-making.

In the future, the current system containing rules will be replaced by a generator of traditional expert system, and it is planned to develop a service Internet of consultation of the documents of town planning for managed.

BIBLIOGRAPHIC REFERENCES

DAVID B., Lamy S, 1993. Données géographiques de référence », revue de géomatique (n°1-2).

DIDIER M.,1992. Utilité et valeur de l'information géographique », Economica.

DRIARD, J.H., (1999)," Autorisations d'urbanisme".
http://alpha.teleriviera.fr/~driard/autorisations/cadre.htm

ESRI 1996. Using Aveune, Customization and Application Development for ArcView,Environmental Systems Research Institute, Inc., Canada, USA.

ESRI 1996. Using ArcView GIS, Environmental Systems Research Institute, Inc., Canada, USA.

EUROVISTA R., 1995. SIG, les Systèmes d'Information Géographique, les utilisations nouvelles de l'information géographique numérique en urbanisme. METL, URBANDATA. France, pp 46-68.

JOURNAL OFFICIEL N° 52 de la République Algérienne Démocratique Populaire.

GOODCHILD M.F., 1987. A spatial analytical perspective on geographical information system», International Journal of Geographical information system, vol 1/4 , pp 327-334.

LAARIBI A., 1995. Systèmes d'information géographique et analyse multicritère : intégration pour l'aide à la décision à référence spatiale », Thèse (Ph. D.), Département de géographie Université Laval, Québec.

LAURINI R., **MILLERET R.F**., 1993. Les bases de données en géomatique , Hermes,

MAGUIRE D.J.,1991. An Overview and definition of GIS, Geographical Information

PORNON H. 1992. SIG, des concepts aux réalisations. Service Techniques de l'Urbanisme, Hermès, France.

RAHMANI C., 1982. La croissance urbaine en Algérie – coût de l'urbanisation et politique foncière. Edition OPU, Algérie, pp. 21-24.

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ROLAND P-DROUX, 1996. Système d'information et gestion du territoire**,** Collection META CH – 1015 Lausanne), pp 137.

ROUET P., Les données dans les systèmes d'information géographique » ; Editions Hermès, Paris,

TUFFERY C.,1997. Les SIG dans les entreprises », Hermès, Paris.

BIOGRAPHICAL NOTES

Boualem CHORFA, Researcher Engineer at the Géomatic laboratory of the National Center of the Space Techniques (Arzew/Algeria) under the supervision of the Algerian Space Agency. My activity of research is dependent on the one hand, with the analysis and the modeling of the urban data, and other share with the integration of the new techniques of geographical information management. The results obtained through my research tasks in this field, gave place to various forms of valorization through the presentation of communications within the framework of national and international scientific demonstrations.

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