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Modeling the Expropriation Procedures using UML – The case of Greece

Apostolos Arvanitis¹, Archontis Sismanidis² and Haroula Tsigarda³

¹Aristotle University of Thessaloniki,
School of Rural and Surveying Engineering
Department of Cadastre, Photogrammetry and Cartography
U.B. 439, 54124, Thessaloniki, Greece
aarvanit@topo.auth.gr

²Aristotle University of Thessaloniki
School of Rural and Surveying Engineering
Department of Cadastre, Photogrammetry and Cartography
U.B. 439, 54124, Thessaloniki, Greece
asismani@topo.auth.gr

³Aristotle University of Thessaloniki
School of Rural and Surveying Engineering
Department of Cadastre, Photogrammetry and Cartography
U.B. 439, 54124, Thessaloniki, Greece
chtsigar@topo.auth.gr

Abstract. *The subject of the present paper titled “Modeling the Expropriation Procedures using UML” is the modeling of the processes which occur during a Land Expropriation. These processes concern the spatial transactions that are carried out in the real properties located in the study area, the administrative decisions and the changes in the real rights. The base for the development of the model is the techniques of object – oriented designing and specifically the use of a common language of modeling, known as Unified Modeling Language (UML).*

In the particular study, the processes that are executed during the implementation of an Expropriation Act in Greece are described as well as the way of regulation of real rights and the way that spatial transactions are realized.

Firstly, the steps that are followed in Expropriation are reported and also the main parties involved in the act are described. Continuing, the modeling of the processes in a Land Expropriation was carried out using the Unified Modeling Language (UML).

The diagrams that are being selected in order to model the processes in an Expropriation are the activity diagram and the use case diagram of the Unified Modelling Language. The activity diagram represents the activities that are realized and the operations that should be executed within a system in Greece and the use case diagram represents the interaction between the different actors and the system.

Finally, the conclusions which resulted from modeling the processes of the Expropriation Act are formulated.

Keywords: *cadastre, data modeling, expropriations, real rights*

1 Introduction

The ownership on real property is protected by the Constitution in most countries. This has also been included in the First Protocol of the European Convention for the Protection of Human Rights and Fundamental Freedoms. Article 1 states that, "A very natural or legal person is entitled to the peaceful enjoyment of his possession". Because of the nature of real property the right of ownership can, however, not be unlimited, but a right to interfere in it, when necessary, has been reserved for the society. There are normally strict preconditions for the interference in order not to harm the functions of the free market, as can even be seen from the above mentioned European Convention, which continues "No one shall be deprived of his possession except in the public interest and subject to the conditions provided for by law and by the general principles of international law". (Viitanen, 2004)

Many countries use classic instruments like compulsory purchase or expropriation for urban development. But those instruments often cause the resistance of the landowners who do not want to lose their plots. Controversial negotiations, irregular demands on compensation as well as longsome court proceedings can follow. Those effects might cause extreme delays in the realisation of sustainable urban development. (Muller – Jokel, 2004)

Generally in Greece, expropriation is the main way of the acquisition of land. In *urban regions*, especially for Land Readjustment reasons, according to the law 1337/1983 "New Residential Code" the necessary land for the creation of public spaces and facilities (roads, schools, green spaces, etc.), are ensured with a socially right way, with concession of department of land from each property depending on the size (contribution in land).

Contribution in land is the obligatory participation in land, without compensation from the municipality or community, in the disposal of extents that are essential in order to create streets, squares and space for commonwealth uses.

This method is better to be used instead of expropriation, because the last one appears to have many problems during the procedure. The most important is that it does not protect the ownership and the social equity of

landowners and is expensive for the government. Also it is a time consuming method.

In some cases however, where the space acquired with the contribution in land is not sufficient, the process of expropriation for the acquisition of these, is applied. This method, which State tries not to use because of many disadvantages, will be reported below. (Tsigarda, 2006)

Land Expropriation is the abstraction of property, with an administrative act. This act is accompanied with the payment of compensation of the expropriating authority to the owner's land. The expropriation constitutes the most powerful mean of acquisition of real estate's for the state, but also the heaviest for the citizen.

2 The regulation system of expropriation in Greece

As mentioned above, expropriation is the primary method for land acquisition in the rural areas, and also in the urban areas when the land acquisition cannot be achieved in any other way.

Usually when private property is acquired for public purposes, the owner and the public authority reach an agreement about the amount of money the owner will receive. Then, the sale is completed in a same way the owner had sold the property to a private purchaser.

However, when the owner does not agree to sell the property to the public agency, either because of the amount of money being offered, or for some other reason, the law may authorize the agency to expropriate the land. In this case, the expropriation process, the method for determining compensation, and the rights of both the owner and the expropriating authority, are set out in the Expropriation Act.

The main legislative framework for the Land Expropriation in Greece was the law 2882 / 2001, "Code of Obligatory Expropriations". According to this law, the public authority responsible for the declaration of expropriations and the progress of the whole process is the General Secretariat for Development.

Below, the processes that are followed in the expropriation are being analyzed:

- Way of declaration of expropriation.
- Purchase or exchange the real estate that is going to be expropriated.
- Prerequisites of declaration of expropriation.
- Process of recognition of beneficiaries.
- Process of determination of compensation.
- Consummation of expropriation.
- Recall and withdrawal of the expropriation.

2.1 Way of declaration of expropriation:

The expropriation of real estate is declared with decision of General Secretariat of Region in which the real estate or its bigger part is located. The decision is published after proposal of Hellenic Public Real Estate Corporation.

The General Secretariat of Region is responsible for the declaration of expropriation in the cases where:

a) All public projects that have been included in Regional Operational Program, except from the works that concern the National Road Network that has been characterized as Trans-European or development projects belonging in protected, by the law, international or other inter-country agreements regions.

b) The projects that have not been included in the Regional Operational Program, but the area that would be expropriated is smaller than 100.000 m². If the extent of the area is bigger than 100.000 m², the expropriation is declared with a common decision by the Minister of Economy and Finances and the relevant Minister that are responsible for all kinds of expropriations.

The decision of the declaration of expropriation is published in the Official Government Gazette. Only after the publication the expropriation is consider to be in force.

The general Secretariat of Region dispatches a copy of the expropriation act and two copies of cadastral diagram and cadastral table to the Ministry of Finance and to other relevant Ministries.

Also a copy of the declaration of expropriation is dispatched to the Officials of Cadastral Office or Transcriptions and Mortgages Office, in order to realise the registration.

2.2 Purchase or exchange of the real estate that is going to be expropriated:

The General Secretariat of Region is able to buy the real estate instead of expropriate it. This purchase is possible to become the subject of declaration of expropriation afterwards. But it has to be applied before until the juridical decision of determination of compensation is published. The price for which the State purchases the subject real estate is determined by the Evaluation Committee.

Depending on the size of the real property that is expropriated the beneficiary of compensation can get a real estate equivalent to the expropriated area of the real property which would be located at a new location.

2.3 Prerequisites of declaration of expropriation:

For the publication of the decision of the declaration of expropriation are required:

- Cadastral diagram which represents the area that has been expropriated,
- Cadastral table which presents the landowners of expropriated real estates.

The cadastral diagram and cadastral table are based upon with current topographical measurements of properties from the Hellenic Public Real Estate Corporation.

If the expropriating authority considers that the cadastral data is incomplete or incorrect, it dispatches data to the Hellenic Public Real Estate Corporation in order to apply the required changes.

For issuing the declaration of expropriation the statement of authority that proposes the expropriation is required, in which the aim of expropriation is reported and the extent of the area that has been expropriated is determined. The statement is published in a daily newspaper in Athens or in Thessaloniki. At the same time, a billposting of statement in the City Hall or in the Communal Building is carried out, which is submitted in the authority that published the statement.

2.4 Process of Recognition of Beneficiaries

- The recognition of litigants:

The litigants are:

1. Those who indebted to pay the compensation,
2. Those who interested for whom the expropriation was declared the expropriation
3. Whoever demands ownership or other real right in the expropriated real estate.

The General Secretariat of Region has the general assiduity for the determination of compensation and the recognition of beneficiaries, as well as the implementation of expropriation.

The General Secretariat of Region notifies to the Ministry of Finance and the relevant Ministry, all his activities about the expropriation at hand.

A file with all the relevant data concerning the expropriation is drawn up and it is kept by the authority which carried out the expropriation. For the expropriations that are declared by the decision of General Secretariat of Region, the file is kept in the Hellenic Public Real Estate Corporation. For the remaining cases the file is kept under Supervision of Public Fortune of Ministry of Economy and Finances.

- Juridical recognition of beneficiaries:

The recognition of compensation of beneficiaries is done with juridical decision.

Responsible for the recognition of compensation's beneficiaries is the one-member court at first instance in the region to which the subject real estate or its bigger part belongs to.

Anyone of the litigants can require the recognition of beneficiaries of compensation. Requirement is accompanied by a certification of the Hellenic Public Real Estate Corporation.

The Hellenic Public Real Estate Corporation submits a written certification of the projection or not rights of State in the real estate that has been expropriated to the court. Continuously the beneficiary submits rights and attaches his titles of property or other probative data for the way of possession of property.

After receiving the submitting data, the judge announces the place and the time of discussion. A copy of the notification in which every beneficiary is asked to appear in person at the court is notified, with assiduity of court, fifteen days before the day of trial. This notification is sent to the indebted to payment of compensation and to those that are brought as beneficiaries.

The court recognizes the beneficiaries of compensation based on the data that the litigants bring. The recognition is completed after the publication of final decision for the real estate that has been expropriated.

The court abstains to publish decision of recognition of beneficiaries for compensation: a) if the property that has been expropriated is probably belonging to the State, b) if the property ownership that has been expropriated is declared by many parities and the confirmation of beneficiary is difficult to be done and c) if the person who declares the ownership the real estate is proven not to be the beneficiary of the real property.

- Administrative recognition of beneficiaries:

The recognition of beneficiaries of the compensation is possible to be completed administratively, provided that the price of the unit has been determined.

The administrative recognition is possible in the cases where the State is the indebted to pay the compensation and the amount of compensation does not exceed the sum of 6.000 euros.

For the administrative recognition of beneficiaries a committee is constituted by the Minister of Economy and Finances. Members of the committee are:

1. A judge of appeal, that serves in Court of appeal in Athens,
2. A lawyer that is proposed by assistant from the Legal Council of State and from the Director of Public Fortune of Ministry of Economy and Finances.

The application for the administrative recognition of the beneficiaries of the compensation, the supporting documents and the titles, are submitted, directly or via the Hellenic Public Real Estate Corporation, to the department of Expropriations of Supervision of Public Fortune of Ministry of Economy and Finances, which is given to the committee for examination.

The committee completes the required data and processes all the data that was submitted. The decision of the committee is published within one month from the moment that all the relevant data has been collected.

2.5 Process of determination of the compensation:

Estimate the value of real estate that has been expropriated:

After the declaration of expropriation, a committee proceeds in the estimation of value of the real estate that has been expropriated and the determination of the amount of the owed compensation.

The valuation committee is constituted from:

1. The head of Hellenic Public Real Estate Corporation in the region of subject real estate or it's bigger part
2. An employee of a familiar Public Economic Service
3. An expert in land valuation and
4. As a secretary of the committee is appointed an employee of the Hellenic Public Real Estate Corporation, with his assistant.

The valuation committee, makes an appraisal for the expropriated area for each application of interest from the beneficiaries of the compensation handed in.

The committee is convened by its head and, after investigation of the data that was submitted, the valuation report is processed, in thirty days. A report describes the in which the situation of the real estate that has been expropriated and its components in details, as well as the amount of the owed compensation.

If a disagreement for the value of the expropriated real estate comes up, all the opinions are reported.

- Correction of the cadastral data:

In the case where the landowner considers that the cadastral diagram and the cadastral table are to be mistaken, he could ask for the correction or completion of the data. The same right has the General Secretariat of Region and the Hellenic Public Real Estate Corporation. The beneficiary has the right to apply for cadastral correction for a specific period of time after the day of the declaration of the expropriation (this period is not defined in "New Residential Code").

The application is submitted at the authority that declared the expropriation and it is examined without delay from the Hellenic Public Real Estate Corporation. If the application becomes acceptable, the Hellenic Public Real Estate Corporation proceeds to the corresponding correction or completion.

Copies of the corrected cadastral diagram and cadastral table are transmitted from the authority that publishes them to the Cadastral Office or Transcriptions and Mortgages Office in order to register them.

Each contestation for the precision or the plenitude of data in cadastral diagram and cadastral table is solved at the trial which concerns the recognition of beneficiaries, after the application from the interested.

- Preliminary Procedures:

The decision of expropriation declaration is registered by the officials of Cadastral Office or Transcriptions and Mortgages Office in the portions of the expropriated real estate and the landowner.

The officials at Cadastral Office or Transcriptions and Mortgages Office give certificates of ownerships, encumbrances and attachments in real estate that has been expropriated, as well as certificate of registrations in the book of claims.

- Process of determination of the compensation:

A. Determination of temporary compensation:

Responsible to determine the temporary compensation is the one-member court of first instance, in the region of which the real estate or the bigger part of it, is located.

The one-member court at first instance adjudges all application of interest that has primarily deposited in its secretary.

The responsible judge determines the day for the proceedings of the application. The applicant has the obligation to send a copy of application, to the beneficiaries and invite them for their appearance in trial.

The application is posted to the court of jurisdiction above the subject real estate.

B. Determination of Final compensation:

The court of appeal in the region of which the real estate or the bigger part of this is located is responsible to determine the final compensation.

In thirty days from the notification of decision from the one-member court, anyone who is interested is eligible to ask for the final determination of the compensation, even he did not exist as a litigant in the trial for the temporary determination of compensation.

The judge determines the day for proceedings of the application. The applicant has the obligation to send a copy of application to the beneficiaries and invite them for their appearance in trial.

If the deadline for the exercise of application expired inactive, the temporary compensation is rendered final.

C. Application of direct final determination of compensation:

The application for determination of final compensation is possible to be practised directly from the court of appeal, provided that there is no pending application for determination of temporary compensation.

Until the first proceeding of application of the direct final determination of compensation from the court of appeal, everyone who is interested it is eligible to ask for the temporary determination of compensation from the one-member court of first instance. In this case the determination of temporary compensation is cancelled.

D. Accommodating determination of compensation:

At the day of trial and before each discussion of application for determination of temporary or final compensation, the court, tries to achieve a compromise between the litigants.

If a compromise is achieved, a notarial document is drawn up. With the signature of this document from the litigants, the process of determination of compensation is finished.

2.6 Consummation of expropriation:

- Ways of consummation of expropriation:

The expropriation is consummated with the payment of compensation to the recognized beneficiary or with the publication of a notification in the Official Government Gazette which certifies that the compensation was deposited in the Fund of Deposits and Loans.

- Deposit of compensation:

Those indebted for the payment of compensation, deposit the compensation amount at the Fund of Deposits and Loans to the benefit of beneficiary.

- Transcription - Consequences of consummation:

After the consummation of expropriation, the beneficiary submits the relative documents that prove the consummation of expropriation as well as a copy of the decision of the recognition of the beneficiaries to the Transcriptions and Mortgages Office.

Continuously each possessor of real estate that has been expropriated is compelled to surrender it at free will, in ten days from the written claim, in which the way of implementation is prescribed. If the possessor does not surrender the real estate at free will, he is ordered to surrender it from the responsible court.

2.7 Recall and Withdrawal of the expropriation

- Recall and Withdrawal of an expropriation that is not consummated:

The authority that declared the expropriation is in position to recall it, totally or partially, before it is consummated.

The decision for the recall and withdrawal of expropriation is published in the Official Government Gazette.

The interested subjects submit the decision of recall and withdrawal of expropriation in the Cadastral Office or Transcriptions and Mortgages Office in order to realise the registration.

- Recall and Withdrawal of an expropriation that is consummated:

Consummated expropriation that was declared in favour: a) of the State, b) of legal persons of public right, c) of local authorities, d) of enterprises that belong in the State and in legal persons of public right and e) of organizations of

common utility; is possible to be recalled totally or partially provided that the responsible authority that has been declared the expropriation, judges that it is not needed any more for the achievement of the initial aim.

Total or partial recall of expropriation takes place with decision of the authority which has declared it, provided the compensation of the expropriation is returned to the indebted.

The decision of the recall of expropriation is registered in the books of transcriptions with assiduity of each interested. Without the transcription of this decision the ownership or other real right that has the landowner in the real estate is not recovered.

3 Unified modelling language (UML)

Modelling is the process of development of models and it is usually based on a selected methodology, experience and practicalities. Any model, true to its purpose, contains only the important aspects of a given part of the real world, and thus simplifies and omits everything else. The choice of the contents and composition of the model is a matter of judgment and depends on the purpose and application of the model. Modelling is both a validated and generally recognized developmental approach used in most of the engineering domain. (Blaha, 2004). The model represents a draft of solution and provides the fundamental guideline in implementation of engineering procedures. The modelling technique can be successfully used in analysis of complex procedures, such as real estate transactions, which are, due to their complexity, hard to monitor and regulate directly. System engineering and especially software engineering are the leading disciplines in system modelling, whose process – based approach and results are adopted by other disciplines as well (Sumrada, 2006).

The Unified Modelling Language is a general visual language, used for definition, representation and documentation of structure of discrete systems. (Rumbaugh, 2005). UML constitutes the best way of ontological modelling, generally acceptable in various methods and modern modelling tools in the modern technology, because it provides a rich and uniform terminology through graphical descriptions and representations, capable of modelling complex systems as it incorporates extension mechanisms (Sismanidis, 2004).

UML can be used for the development of a database independently from the database management system (DBMS) where the model will eventually be implemented. There is also a significant reason for the adoption of UML as a modelling language. ISO TC/211 and OGC which deal with the standardization of geo-data selected the UML as the appropriate language for geographic data modelling (Arvanitis – Sismanidis, 2005).

The conceptual formalistic approaches and modelling methods are composed of both, a developmental procedure and a formal descriptive technique. The modelling language is the central and essential part of any developmental methodology. UML is intended to support most of object –

oriented analytical and planning methods. It enables a gradual, and simultaneously, an iterative developmental process. In the UML, the graphical notation is the basic syntax of visual representation of the contents of models in related standard diagrams. The simultaneous modelling of a problem domain from different, but related aspects enables an understanding and formal description of complex models in a semantically uniform way. Such different aspects of the existing or designed system can be graphically represented in the UML with detailed and hierarchically built diagrams.

Regarding the aspects of a model, the UML determines the following graphic diagrams (*Object Management Group "Unified Language Specification", complete specification, 2003*):

- *Organizational model*
- *Functional model*
- *Static model*
- *Dynamic model*

In this paper, we concentrate only on the functional model for modelling the expropriation's procedures in Greece. Specifically the use case diagram and activity diagram are analyzed.

Use Case diagram: It shows the relationship between use – cases within a system or order semantic entity and their actors. A primary purpose is to describe how users and stakeholders, from now on called actors, use the system. It is sometimes called external view of the system. It describes the interaction between the system and external environments. The Use Case consists of three elements: actors, use - cases and system boundary.

The relationships between actors can be organized using the concepts such as generalization, "Uses" and "Extends". In "Uses" relationships, base use case explicitly incorporates the behaviours of another use case at a location specified in the base and avoids describing the same flow of events several times. Lastly, the "Extends" relationship between use cases means that the base use case implicitly incorporate the behaviours of another use case at location specified in directly by the extending use case. It is used to model the part of a use case the user may see as optional system behaviours.

To make sure that all actors are identified, the activity of identification of actors is iterated while defining use-cases and describing the relationship between use-cases and actors until all actors and use-cases are identified and modelled.

Activity diagram: It is used to explore and describe activities or workflows in the organization. They are basically flow charts that are used to show the workflow of the system. It provides a graphical way to document a business workflow in a simple and intuitive illustration of:

- What happens in a workflow,
- What activities can be done in parallel, whether there are alternative paths through a workflow

The activity diagram also describes the roles and areas of responsibilities in the business in other words that is responsible for doing what in the business. Roles and areas of responsibilities are documented as columns in the activity diagram. Swim lanes show which business workers participate in the realization of the workflow. (Tuladhar, 2002).

4 Modelling the expropriation's procedures using UML

In general, the participants of an expropriation act can be the Hellenic Public Real Estate Corporation, the officials of cadastral office or transcription and mortgages office, the Committee of Evaluation, the General Secretariat of Region, the Beneficiaries of the land and finally the court of the competent jurisdiction. These participants are involved with concrete procedures and thus are created by the Use Case and Activity diagram.

Below, the way of creation of the Use Case diagram and Activity diagram is described.

4.1 Drawing Use Case Diagram

As mentioned above, Use Case diagrams identify the functionality provided by the system (use cases), the users who interact with the system (actors), and the association between the users and the functionality. Use Cases are used in the analysis phase of software development to articulate the high-level requirements of the system.

The primary goals of Use Case diagrams are:

- Providing a high-level view of what the system does
- Identifying the users ("actors") of the system
- Determining areas needing human-computer interfaces

Use Cases extend beyond pictorial diagrams. In fact, text-based use case descriptions are often used to supplement diagrams, and explore use case functionality in more detail (OMG, UML specifications, 2003).

The following figure is Use Case model for the expropriation's procedures. In this model, there are six actors interacting with eight Use Cases in a system whose boundary is defined by the "Expropriation".

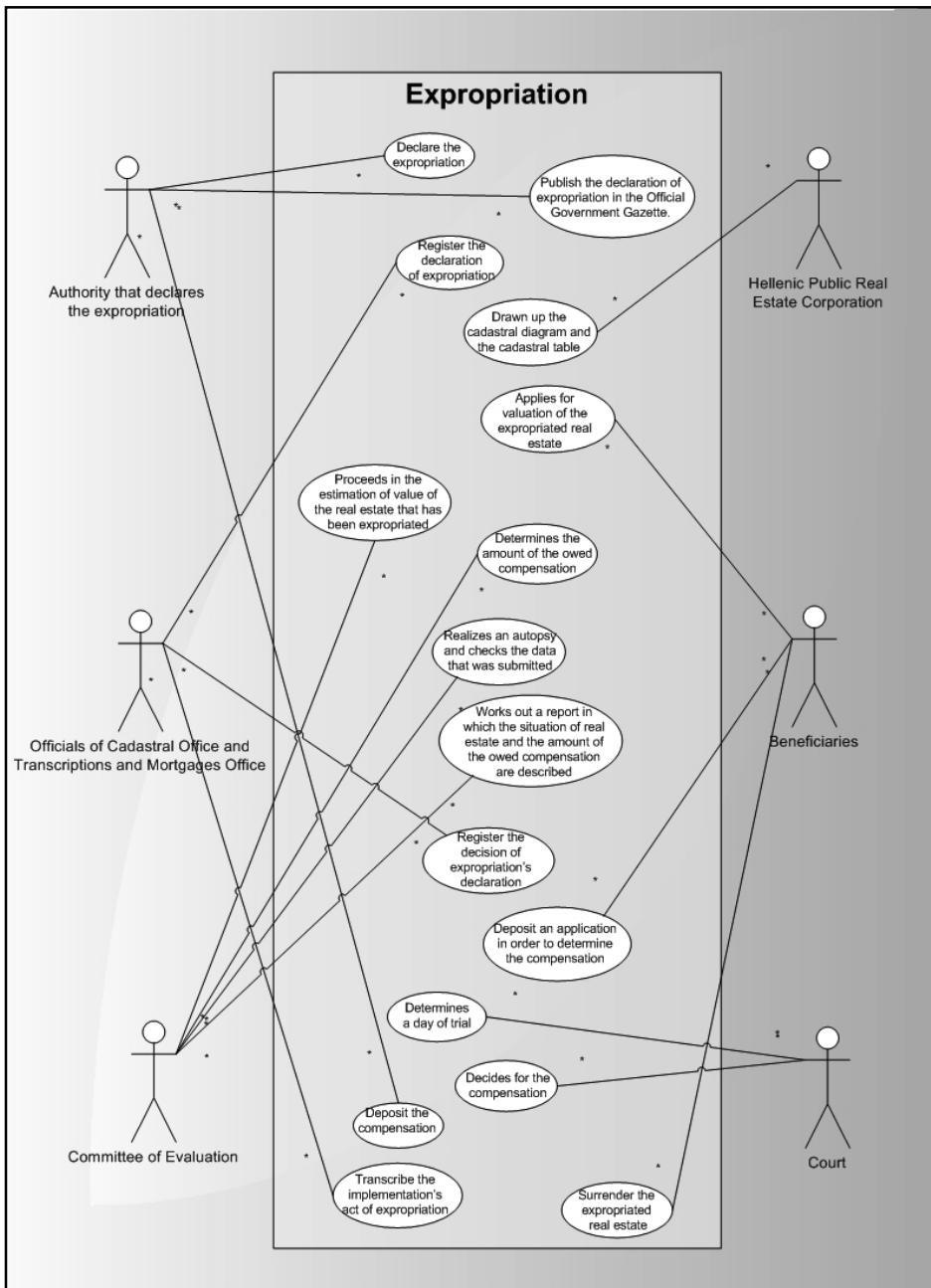


Figure 1. Use Case model for the expropriation's procedures in Greece.

4.2 Drawing Activity diagram

The activity diagram is used to describe activities or workflows in a system, such as the activities that take place in order for the cadastral transaction to be realized. In other words, through the activity diagram the way in which the cadastral objects interact is presented.

The activity diagram is a useful modelling tool, as:

- It describes graphically the internal behaviour of the operation.
- It portrays activities that could be accomplishing at the same time.
- It determines the persons in charge for each activity.
- It allows the discovery of common operations in the system.
- Used for the coding of specifications.

(OMG, UML specifications, 2003)

The following figure is Activity model for the procedures of expropriation.

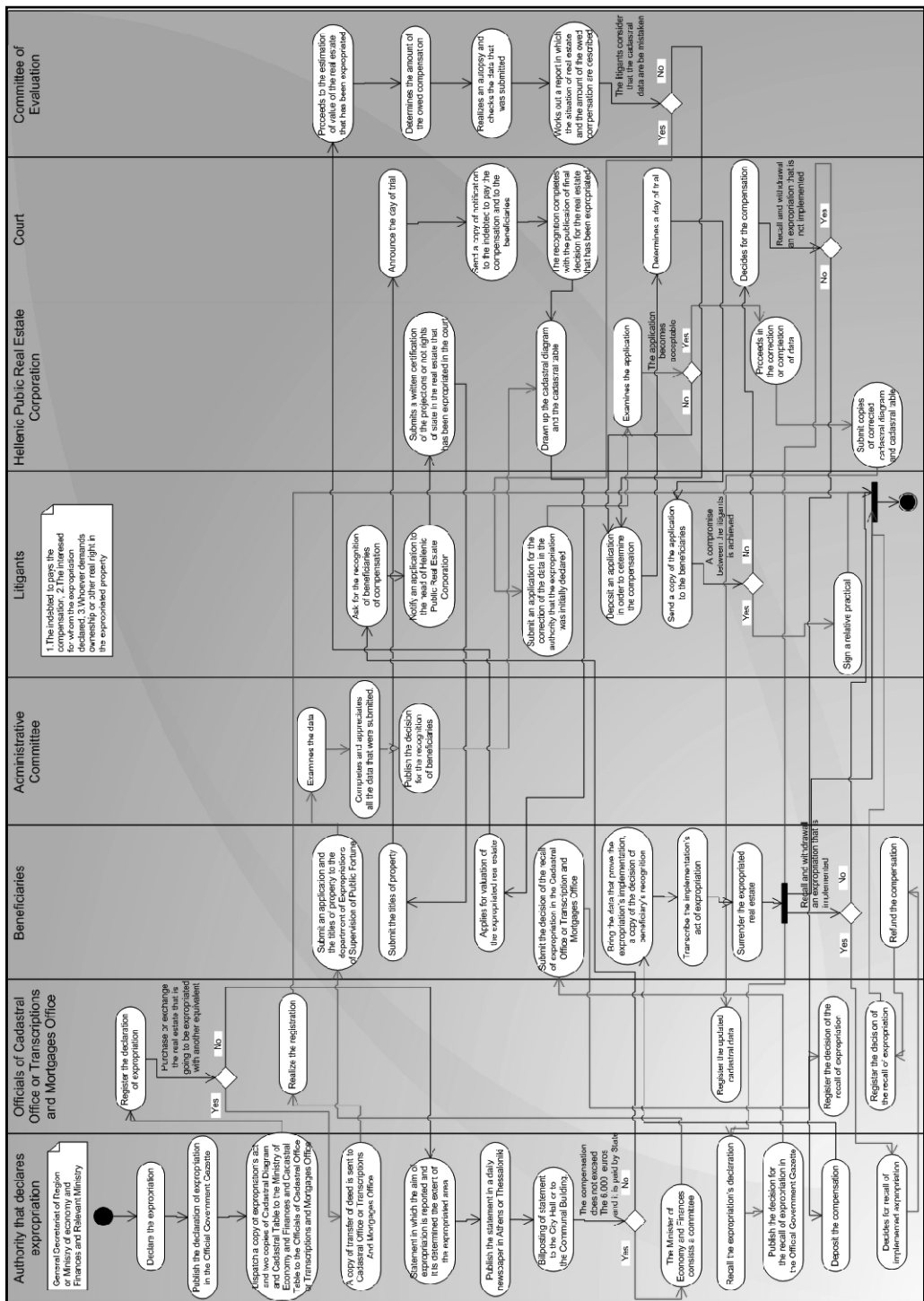


Figure 2. Activity Diagram for the expropriation in Greece

5 Conclusions

Expropriation might be used for acquiring the land required for urban development to public ownership in advance, so the land would be available when needed. Planning would be easy when planning public land.

In Greece, expropriation is a widely used method in land acquisition but is tried to be avoided when another way exists because of the complexity of the process, long duration and expensiveness. Another reason is the disfavour of the method, interference with private ownership by compulsion is not considered appropriate. The political decision-makers seem to fear the drop of their popularity if they are in favour for restoring the expropriation process. Further, there are other means for advancing the implementation of urban land.

For example Land Readjustment is a very elegant and economic instrument to realize urban development plans. This method of land exchange means no financial risk for the municipalities, because they do not have to purchase and to finance the original plots. According to the Land Readjustment¹, public spaces acquired with contribution in land as every property has to offer a specific percent of land depending of its size. In some cases where the contribution land is not enough for the creation of public spaces, it is necessary to apply expropriation is specific real properties (depending on their size).

Unified Modelling Language constitutes the best way of ontological modelling, because it provides a rich and a widespread known vocabulary of communication and standardized graphical representations that offers to the users of distributed information the possibility to search the solutions between the ontology and the capability to express those restrictions that cannot be easily represented by using the descriptive logic. (Arvanitis – Hamilou, 2004).

UML can be regarded as a tool providing solution for improvement of organisation of land information service and, thereby, reducing costs and increasing profitability. UML is a useful tool not only for technical specialists but also for surveyors and legal experts to analyse cadastral processes for their further improvement and revision.

Regarding the effects of modelling on international level, the modelling of expropriation procedure with the use of a widespread known graphical language, like UML, entails the successful information exchange, comparison of the national cadastral systems and communication between the various cadastral systems.

References

1. Arvanitis A., Hamilou E., (2004) – “Modelling Cadastral Transactions in Greece using UML” – FIG Working Week, Athens– Appropriate Technologies for Good Land Administration I.

¹ New Residential Code consists the legal fragment of Land Readjustment

2. Arvanitis A., Sismanidis A., (2005) – “Modelling the Cadastral Data”, COST Action G9 – Modelling Real Property Transactions, Aalborg.
3. Blaha M., Rumbaugh J., (2004) – “Object – Oriented Modelling and Design with UML”. Prentice Hall.
4. 2882/2001 Law, “Code of Obligatory Expropriations”, Published in Government Gazette, 2001.
5. 1337/1983 Law, “New Residential Code”, Published in Government Gazette, 2003.
6. Muller – Jokel R., (2004) – “Land Readjustment – A – Win – Win – Strategy for Sustainable Urban Development”, FIG Working Week – Spatial Planning for Sustainable Development – Policies and Tools, Athens, Greece.
7. Rumbaugh J., Booch G., Jacobson I., (2005) – “The Unified Modelling Language Reference Manual”. Addison – Wesley Object Technology Series.
8. Sismanidis A., (2004) – “Modelling the Spatial Cadastral Data”, postgraduate thesis 2004, Aristotle University of Thessaloniki, School of Rural and Surveying Engineering.
9. Sumrada R., (2006) – “Modelling Real Estate Transactions with UML”, National Science Digital Library, <http://nsdl.org> accessed in May 2007.
10. Tsigarda H., “Modeling the Spatial and Legal Processes in a Land Readjustment procedure in Greece”, thesis 2006, Aristotle University of Thessaloniki, School of Rural and Surveying Engineering.
11. Tuladhar A.M., (2002) – “Why is Unified Modeling Language (UML) for Cadastral Systems?”, International Institute for Geo-Information Science and Earth Observation, <http://www.itc.nl/library> accessed in May 2007
12. Viitanen K., (2004) – “Compulsory Purchase as an Administrative Procedure – Based on Finnish Legislation and Experiences”, 3rd FIG Regional Conference, Jakarta, Indonesia.
13. Viitanen K., (2005) – “International Valuation Standards and Land Administration” – FIG Working Week 2005 – Valuation and Real Estate Management II, Cairo, Egypt.
14. Object Management Group, www.omg.org , accessed in May 2007.