Informal settlements in Greece: problem characteristics and new technologies’ contribution for its solution.

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1. Introduction
A usual form of urban development during the last decades in Greece is the informal settlements. Their development was enhanced form the 50’s, it continues until today and it perceives in the limits of the urban areas and in the suburban outer space.
The reasons that lead in their development are described in this paper, through a brief description of the Hellenic legal framework in issues of urban and land use planning and in parallel the responsibilities of the State and the civilians are depicted as well.
Also the role of new technologies in the development of programs and applications - in the fields of land management and urban planning – and the use of satellite images is being analyzed, as a valuable tool in the hands of the State, in order the control of the informal settlements, their streamlined accession in the urban and suburban formations and the prevention of their future re development could be obtained.

2. Urban and land planning legal framework and informal settlements development brief historical flashback.
Chronically, informal settlements development coincides to the creation of the New Hellenic State in 1928. Numerous reasons exist, for which informal settlements presentation is due to, with the basics to be results of the luck of legal framework and control mechanisms from the part of the states in the issues of: integrated urban and land planning, cadastre, residential policy and inspection of built up licences issue procedure.
The Hellenic State is not the only responsible for informal settlements creation. The civilians themselves have also huge responsibilities, which in order to fulfil personal purposes and benefits did not respect and apply the laws – even with the ellipsis that the legal framework had. In many cases the civilians implemented their own urban and land development policies, being indifferent at the same time for the consequences of this uncoordinated development to the environment and their properties as well. It is well known that the building activities were the main axon of development in Greece, especially after the end of WW2 and this resulted to the surrender of the State to privet interests.

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By the 19th Century politician in Greece had to face, in numerous cases, the interests and the pressures drilled by powerful landowners, regarding the residential and urban development of the New Hellenic State. One characteristic example is the uncompleted implementation of the Kleanthis and Schubert’s Athens’ urban development plan – in the middle 19th century – due to pressures and interferences by the powerful landowners.

2.1. Hellenic urban and land planning legal framework brief historical review.

Hellenic urban and land planning legal framework is divided into four chronic periods:

- **1828 – 1923:** During this first period the reconstruction of Greece is undertaken. Until 1920 new territories are added in the Hellenic dominion, whereas the 1922’s Near East catastrophe, results to the inrush of 1,000,000 person, whose housing needs were immediate.

  In this period the first efforts for preparation of urban and town plans were struggled, in Athens, Patras, Nafplio, Nafpakto, Monemvasia, Pylos, however with out the urban planning being governmentalize and the urban planning rules having more police than legal character.

- **1923 – 1970’s:** During this period two governmental enactment, which were considered as breakthroughs, were lunched, the 17 -7/16 – 8 – 1923 “About Cities, Towns and Settlements plans and building procedures” and the 3-4/1929 “About Street Plans Elaboration and Implementation”, in which elaboration and approval rules and the first Hellenic Construction Rule are included. The above mentioned enactments consists the Hellenic State’s first coordinate action for land control and utilization.

  They also exercise quantitative control in the settlements’ constructional characteristics (especially in the Street Plans determination), without at the same time to exercise qualitative control, since they **DO NOT**: connect the land uses and activities to the town shell, enforce the State’s de facto obligation in urban and land development, suggest ways for cooperation between the State and the civilians during the urban development procedure. In parallel they enhance the apart from town plans areas urbanization, through particular arrangements, such us the building in fields with face in national, county and agricultural, touristic or coastal road, which lead in the settlements creation, without the existence of a particular plan and state coordination, in all Hellenic dominion.

- **1970 – 1982:** The 1975 Constitution and in the 24 article, the state’s obligations and the jurisdictions, in the urban development and natural environment protection fields. In parallel the Law 306/1976 “About land planning and environment” compromises the fusee for the National Urban Planning Council’s decisions 9610/23 – 3 – 1979 regarding

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The above mentioned laws and enactments resulted to the enactment’s 17-7/1923 substantial abeyance (this enactment permitted the without limits residential development). In parallel they created decline in the construction activities – causing a series of problems to the population groups involved with the constructions – but they gave the opportunity to the public to be more sensitive about urban and environmental problems.

- **1982 – Until today:** The law’s 1337/1983 character was originally transitional for the needs’ in housing accomplishment, but in continuance represented the urban planning basic legal framework and implementation tool. His prerequisite was the preparation of Urban Plans for all the Hellenic Local Administration Organizations, thus it was known by the term “Urban Reformation Undertaking”, mainly for primary residential areas. This law was followed by the enactments 16-8/30-8-1985 and 24-4/31-5-1985 for secondary residential/holiday areas and for settlements with less than 2000 inhabitants respective.

In laws 1982/1990 and 1947/1991 goad the public lands exploitation through land promissory notes and the privet urban development along with the public, under the prerequisite that Urban Plans’ preparation would be by physical or legal privet sector’s entities.

The law regarding the sustainable urban and residential development secures the settlements’ sustainable development and the residential expansion economy and in parallel sets the necessary conditions for legal urban areas’ regeneration.

In Law 2242/1994 the secondary residential areas urban development specifications were stetted, along with the Urban Control Zones institute.

Laws 2508/1997 and 2742/1999 were amended by the law 3044/2002 with many statutory changes regarding the construction activity being included. Some of those changes in specific were aiming to the environmental protection and cities, towns and settlements sustainable development safeguarding.


During this last period urban planning is officially public’s sector responsibility, along of areas’ urbanization in parallel to Urban Plans’ elaboration, approval and implementation is the State’s, the Local Self –administration Organizations’ or public authorities’ responsibility.

### 2.2. Informal settlements’ development encheason.

Previous’ paragraph main conclusion is that the informal settlements’ appearance is due to the Hellenic’s legal framework gaps in issues regarding Urban and Land Planning and in general development.

During Hellenic State’s first 100 years operational time, there was no reference in Hellenic legislation for rules in urban development thus any restrictions in construction activities, which resulted to a situation where anybody could build anything, anywhere, without being subjected to any control.

Although the 1920’s enactments an effort was made in order for some substandard rules to be enforced, the luck of National Residential, Urban and Lund Development Master Plan, contributed the maximum in the intensity of this phenomenon/problem. The huge declinations during the enactments’ implementation, led to the emerge of settlements which today do not compromise the basic social prerequisites – public places existence, adequate pavements and roads’ width, public utility networks – thus 3 categories of informal settlements: in urban areas according the 17-7/1923 enactment, settlements existing before 1923 fallowing their own legal framework and outside official urban plan areas.

After the end of WW2 and civil war, the destroyed Hellenic countryside led thousands of people in the big cities – seeking for work – that had immediate housing needs, gave the
opportunity to the private sector for immediate action in construction activities, but without coordination, with only aspect the quick and easy turn and with no absolute restriction.

The 1923 – 1972 period’s problematic urban legislation, the zero record of private and public lands – Cadastre – and in parallel the lack control mechanisms, resulted to the Hellenic State’s inability to secure his properties, such us forests, beaches, ect, “motivating” the farther development of informal settlements, which at this moment was followed by the wide enclosure of public land. Those “newly born” residential concentrations still did not fulfill the basic social prerequisites (as those are outlined above), signaling the beginning for natural’s and urban’s environment decline in Greece. The arbitrary placements of houses, factories, shops, ect, in all Hellenic territory, combined by deforestation, rivers’ filling with rubble and residential and industrially wastes throw in them (due to the swage networks luck); led to the natural environment’s gradual decline and in numerous cases to his destruction.

In 1970 – 1982 period the first serious efforts, from the State’s part, were made in order Urban and Land Planning legal framework to be created. The acknowledge in 1974 Constitution that Hellenic State is the only responsible in issues for the promotion and control of urban planning and environmental protection, could compromise a new beginning in urban development procedure and high – handed acts detention.

Even though in this period the legal framework exists and covers the total of the most substantial subjects in urban development, promoting in parallel environmental protection (that was the main reason that the Ministry for Physical Planning and the Environment and its successor Ministry for the Environment, Physical Planning and Public Works was created), the control mechanisms absence, and the bureaucracy during the decision making possess in Urban and Land Planning and their implementation, condemn this new effort in failure, without countermoving the informal settlements expansion.

During the last period – 1982 until today – the informal settlements expansion and development deterrence was extremely difficult, due to the starkness of the apposite public authorities and the delay in editing, approval and implementation of Urban and Town Expansion Plans.

Even though the legal framework is enforced, in citizens’ conscience the mentality of “building according your interests and wills” was solidified. A characteristic paradigm of this mentality is the efforts for Town Plans Expansion, which procedure had to face huge obstacles because of the appeal to the Higher Court of civilians and privet sector bodies, using as pretext the expansion’s unconstitutionality. But the appeals umbilicus served local, personal and privet profits, through the delay of Town Plan Expansion procedures, enhancing
the chaos in urban development in cities, towns and settlements sharpening the informal settlements (uses and activities) problem.

In 2003 and after Ministry’s for the Environment, Physical Planning and Public Works initiative, efforts were made to solve the informal building activities and settlements problem (thoroughly analyzed in paragraph 2.1.). This initiative included beneficial arrangements for informal buildings fine and penalties reimbursement, temporary connection to common benefit networks, thus their legalization.

But this initiative’s character had receivable that urban planning policy implementation character, without dealing with the problem. The informal buildings legalization is their financial arrangement, without taking into account their needs in the necessary infrastructures – open spaces, parks, squares, adequate pavements’ and roads’ width, networks, protection from natural disasters – and their streamlined incorporation in the legal urban areas.

In parallel this arbitrary legalization of the last decades, generates the mentality that everyone can act arbitrarily, enclose, commit crimes against natural environment and get unpunished.

Today the illegal buildings number estimates to exceed 300.000. The Cadastre’s program implementation first face evinced that over 200.000 ownerships – 15% of total – have questionable titles, which means questionable legal status.

Form the above the conjecture comes, that the encounter of so serious and multidimensional problem, like the informal settlements and illegal buildings, is not a simple process. In this process the state departments and services, engineers and owners consume, with the owners to consider them self always offended and trying all time to unconditionally legalize their arbitration, as the only problem’s sustainable solution. In numerous cases the illegal buildings owners care only for the 100% legalization of their property, without caring for consequences, of this uncoordinated legalization, in the environment and without any kind of urban or land planning.

However a big problem of this kind for the Hellenic State as well as for the owners must be solved through the promotion of sustainable solutions, therefore all the serious side effects, which are caused by this situation, could be reduced to the minimum and eliminated in the future.

The promoted solutions as well would have multidimensional character, due to the problem’s complicate nature and must take into account the problem’s technical, urban, environmental and social parameters and in parallel the urban’s and suburban’s space sustainable management.
The engineer’s role, in this framework, must be enforced, as experienced and skilled scientists and into direct contact with the integrated land management new technologies, whether they work in public or privat sector.


The 21st century is being characterized as the century of information and informatics. The breakthroughs in computer science, in programs and applications’ development concerning the record, management, modification and information retrieval for any kind geographic or spatial data, made new technologies a valuable tool in the technical world hands and especially for Rural and Survey Engineers.

The encounter of informal settlements problem, consists a subtotal of integrated space and land management – urban, suburban and outer urban – and the essential parameter in sustainable environmental, urban and land use planning development process and especial for a country like Greece.

The technological tools that the Rural and Survey Engineer has in his disposal today increase his capabilities in special & land management issues/problems optimum approach. The efforts for confronting the informal settlements problem and legalization process can be subsumed in this above context and are divided in five phases:

- Informal settlements spatial spotting and detailed description.
- Informal settlements classification according to their characteristics and problems.
- Legalization process specifications determination.
- Legalization process monitoring.
- Hellenic’s dominion continuous monitoring for future avoidance of those situations.

In the next paragraphs the above phases are being analyzed.

3.1. Informal settlements spatial spotting and detailed description.

Informal settlements spatial spotting is the first and more essential step in their legalization process. To obtain the optimum result, this phase’s coordination must be Ministry’s for the Environment responsibility, which will have to cooperate with the rest public departments and directions, such as Local Self – government Organizations, urban planning bureaus, Hellenic Public Real Estate Corporation ext.

Unfortunately the Hellenic Cadastre’s luck creates additional problems and difficulties, because in many cases the illegal settlements owners do not accept their arbitrate status and the public authorities can not prove it.

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In the absence of Hellenic Cadastre, informal settlements’ spatial spotting must be in two directions:

- Informal settlements’ spatial spotting in satellite and aerial photographs, in areas where public ownership unchallengeable (forests, coastal land, in limits of legal settlements, towns and cities, public areas).
- Spotting of illegal settlements which do not have legitimate building permissions based on the urban public bureaus archives.

It must be outlined that illegal buildings’ spotting based on the public urban bureaus building permissions archives is an extremely difficult procedure, due the absence of electronically updated records.

After the spotting phase, the detailed settlement’s descriptions face follows and must include:

- Exact illegal buildings number.
- Land uses.
- Buildings geometric characteristics and their age.
- Infrastructures and networks status.
- Settlement’s wider environment description.

A electronically data base must be created, in order to obtain the optimum management of the above data, which will include all the necessary quantitative, metric and qualitative date, projected in an appropriate cartographic background.

In adequate settlement’s wider environment description must include data relevant to the natural environment, neighboring settlements, transport networks and high voltage electricity networks.

3.2. Informal settlements classification according to their characteristics and problems.

After informal settlements spatial spotting and detailed description, they must be categorized according to their problems and characteristics, so as their status management and legalization solution/ procedures are easier.

During the illegal settlements’ classification the following characteristics must be taken into account:

- The settlements terrain.
- Neighboring settlements, towns or cities.
- Illegal settlement’s magnitude (buildings number).
- Dominant land use: residences, industry, ext.
- Naturel, social, cultural environment condition.
In correspondence to the above, illegal settlements’ classification according to their problems is necessary into:

- Illegal settlements with adequate infrastructures situated in the limits of towns or cities urban plans.
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- Illegal settlements with inadequate infrastructures situated outside the limits of towns or cities urban plans.
- Illegal settlements vulnerable to natural phenomenon (floods, fires, earthquakes, shifts).
- Illegal settlements with downgraded environment (close to industrial areas or industries, high voltage electricity networks, auto banks or high speed urban roads or high traffic roads).

Similarly to the first phase, data entry must be carried out in an electronic data base so as their management and modification process is optimum and faster and in parallel the next phase’s legalization specifications determination through multicriteria analysis be easier.

### 3.3. Legalization process specifications determination.

After the two above phases completion and the detailed image formation, regarding informal settlements’ status and conditions, follows the phase of specifications determinations for the legalization process. Those specifications – virtually standards – determination serves three purposes:

A) Public services, directions and departments facilitation during the selection process of the informal settlements, which will be legalized and the legalization implementation monitoring.

B) Informing the direct consuming parties, for the procedures that follow so as to accomplish the necessary preconditions to legalize their buildings.

C) Environmental protection, sustainable urban development safeguarding and rational land and natural resources management.

During this phase particular attention must be given to the preparation of objective specifications, which will have as scope to solve the problems of the illegal buildings and the informal settlement’s in general, as regards the informal settlement’s category for its normal spatial subsumption, the natural environment protection and sustainable development.
ensuring. In addition the must take into account the current legal framework, include the necessary amendments to it, so as the settlement’s substantial sustainability.

Based on the settlements’ categories and problems through multicriteria analysis and using spatial data management computer programs (GIS) and appropriate cartographical background the specifications classify into six categories:

- Specifications for informal settlements with adequate infrastructures situated in the limits of towns or cities urban plans. The majority of those settlements are in legalization phase, by urban plan’s expansion. The only pendency is their economic arrangement by reimbursing the fines imposed to the illegal buildings’ owners. Nevertheless these category specifications must provide for natural environment’s protection, and future prevention reoccurrence of informal settlements in the new urban plan limits.

- Specifications for informal settlements with inadequate infrastructure situated in the limits of towns or cities urban plans. The totality of those settlements faces essential problems in the infrastructure sector (networks, open spaces, ext) and in his general organization. Specifications for this category must set the minimum conditions for infrastructures development (networks, open spaces, parks, ext). In addition must take into account settlement’s location and natural environment’s situation, so as any pressures that might occur during the infrastructures development are rebated. Finally additional specifications, during their legalization process – urban plan expansion – as mentioned in the above category.

- Specifications for informal settlements with adequate infrastructure situated outside the limits of towns or cities urban plans. Those specifications should secure the informal settlement’s equable and rapid connection to the nearest legal urban formation, by creating transport networks. Particular emphasis must be given in the public transport networks, such as suburban railway and tactical suburban buses itineraries. In addition the specifications must reinsure environmental protection (natural, social, cultural environment) and future prevention reoccurrence of the phenomenon.

- Specifications for informal settlements with inadequate infrastructure situated outside the limits of towns or cities urban plans. Specifications for those settlements must have three basic goals: a) necessary infrastructures obtainment (networks, open spaces, ext), b) connection to the nearest legal urban formation, c) environmental protection and settlement’s future sustainability. Alike to the above mentioned cases,
the future reoccurrence of the settlement’s illegal expansion must be prevented, through the enforcement of severe penalties and fines to the infringers.

- Specifications for informal settlements vulnerable to natural disasters and phenomenon. These specifications should particularize in the necessary measures that must implemented in order to secure settlement’s sustainability, in cases of natural disasters or phenomenon outburst, for example the existence of fire protection roads for settlements near forests, protective infrastructures for coast wise settlements, etc, without exercise of pressures in the natural environment and with safeguarding settlement’s sustainability in parallel. In numerous cases, informal settlements vulnerable to natural disasters or phenomenon belong to one of the above categories; they should comply to their specifications also.

- Specifications for informal settlements with downgraded environment. The institution of specifications for these category settlements is a difficult procedure, since the environmental downgrading is caused by land uses irrelevant to the settlement. Specifications should be specialized according to the environmental problem – or problems – that the settlement must confront. For example for settlements close to industrial areas – or industries – all the necessary measures for its protection form air pollution should be implemented (extended plantation of antipollution plants, green zones creation), or in cases of settlements near highways and autobanks sound protective drapes and green zone creation is necessary for the settlement’s protection from noise and air pollution. In cases of settlements near high voltage electricity networks, provision and measures for their immediate relocation should be taken.

In parallel with specifications according to the informal settlements’ problem specifications addressing to its category should be amended. Analytically:

- Specifications with regard to settlement’s terrain. Terrain and ground morphology play an important role in the implementation of any measure for the conditions improvements and in the legalization process in general, especially in cases where infrastructures must be created. Those specifications should be classified into specification for settlements with flat, intense or extremely intense terrain and particularized in sequence.

- Specifications with regard to neighbour legal urban formations. In this series, specifications must be categorized according to the distance between the settlement and the nearest legal urban formation. In cases of settlements that are not near any
legal urban formations, provisions for settlements clustered networks creation should be taken.

✓ Specifications with regards to settlement’s magnitude. Settlement’s magnitude plays significant role in any interventions for the improvement of the settlement’s conditions, particularly in cases when the settlement does not have the essential infrastructures. Those specifications must include the total cost of the necessary works for infrastructures’ improvements and the apportionment of this cost to the illegal buildings owners (this cost should not burden Hellenic state). In addition to the above the specifications must reassure the future settlement’s no expansion, or a control and with strict criteria expansion.

✓ Specifications with regards to the settlement’s dominant land use. The settlements’ needs in infrastructures are directly related to their land uses. For example settlements with dominant land use residencies have greater needs for organized open and green areas, while settlements with dominant land use industrial activities have greater needs for transports infrastructures. This category specifications should be specialized according to the settlement’s dominant land use and discourage future change of it in the future.

✓ Specifications with regards to natural, social and urban environmental conditions. Those specifications should be on the axes of natural, social and urban environment protection and in parallel the confrontation of social problems and inequalities especially during the legalization process. In addition they should avert any future environmental diminution.

Besides the specifications with regards to the settlements’ problems and category (or categories) an additional series of specifications should be institute on the base of the settlements’ administrative status after their legalization. Those specifications are divided into three general categories:

A) Specifications for settlements which will be subsumed in existing and legal urban formations.

B) Specifications for settlements which will constitute autonomous urban – legal formations.

C) Specifications for settlements which will administrative subsumed into clustered networks.

The administrative specifications will have legal character. Especially in the cases b and c the detailed rules concerning the new administrative formations’ creation, function, departments and directions operation and financing must be clarified.

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4. Legalization process implementation and monitoring.

Legalization’s process success depends upon the coordination of all the governmental agencies and directions and their immediate reaction in cases of deviation from the predefined legalization specifications.

Governmental agencies and directions cooperation can be achieved through extranet creation, which will be accessed only by them and all the databases (results of the above phases) will be uploaded. The databases content in quantitative, metric and qualitative data/informations and their projection on the appropriate cartographic background will extremely facilitate the monitoring of the legalization process, in every phase.

The databases must be connected so as:

A) To be possible the continuous and express countercheck of the collected data/informations.

B) To be direct, fast and objective the connection of the data concerning settlements’ characteristics and problems with the specifications legalization categories, in which the settlements will be subsumed. Additionally the databases’ connection provides capability for data modification through the process evolution and the comparative analysis of the settlements’ conditions before, during and after the completion of the legalization process.

During the legalization process additional problems might occur, such as technical difficulties during the infrastructure works or the financial arrangement of the illegal buildings, a new database for the legalization process problems and suggested solutions should be created so as:

A) All the involved governmental agencies and departments in the process be informed at the same time (even if they do not deal with any problem at that time).

B) Acceleration in the problems’ solutions implementation.

C) All the involved governmental agencies and departments implement common solutions, for all legalization cases (and not its agency or department its own).

D) The control mechanisms’ intervention in cases of declination from the legalization specifications is direct and immediate.

Through all the legalization process the direct involved parties (illegal buildings owners) must be kept informed via the internet, where the legalization process evolution will be uploaded. The settlements’ legalization will be considered completed with the determination of the new legal settlements’ administrative status.
5. **Hellenic dominion continuous monitoring – Prevention of informal settlements reappearance in the future.**

The integrated land management prevents the appearance of informal settlements. In countries like Sweden or Denmark, where for many decades integrated land managements pans are implemented – through the use of GIS – this phenomenon is extremely limited. During the last decade internet application like e- Land Management are promoted as tool for better land management and exploitation.

In Greece the National’s Cadastre completion, along with the described above data, could constitute the basic background for the proprietary status and urban conditions in Hellenic dominion.

The use of information systems from all the governmental agencies and departments’ (Ministry for the Environment, Physical Planning and Public Works, urban bureaus, Local Self – governed Organisations) will reinforce the efforts for the informal settlements appearance restriction, especially in the future.

Nevertheless the Hellenic’s dominion singularity - great seacoast length, extended forestry areas, peculiarity in urban and residential formations – inflict its continuous monitoring.

New technologies can significantly assist in the optimum and rational land management. Satellite images, which are wide used and updated frequently, could constitute public’s administration basic toll in the efforts for prevention of new informal settlements appearance.

The involved governmental bodies should ensure the continuous satellite images updates, with parallel employment of specialized personnel.

But to ensure the success of any integrated land management effort and legal framework respect, civilians must be kept informed for their rights, obligations and inflictions in cases they do not respect the laws – in issues of urban planning and building activities). The becoming conscious from the civilians that urban and land policies are within the government’s jurisdiction, his dependable and on time information in urban and land planning issues and process – mainly via the internet -, his access to corresponding legal framework and the simplification of the procedures for building licences – especially through the new technologies use - could have beneficially results in any efforts for informal settlements appearance.

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