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Possibilities of Integrating Public Law Restrictions to 3D Cadastres

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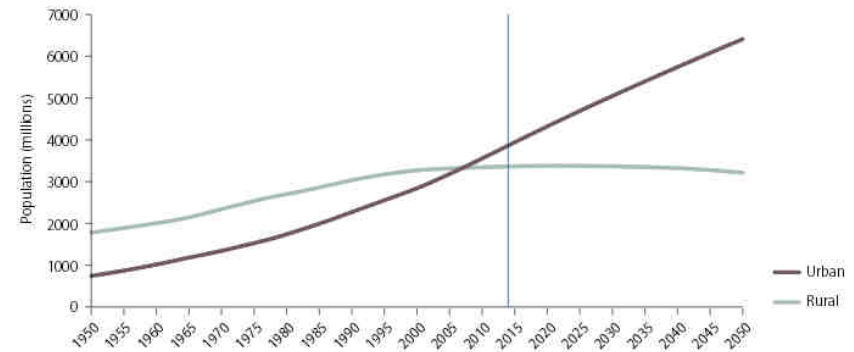


Outline

- Introduction
- Public Law Restrictions (PLRs)
- Recording PLRs
- 3D PLRs in Greek Public Law
- Conclusions and Further research

Introduction (1/3)

- Urbanisation
- Technological development



Source: UN, 2014

High-rise, overlapping, interlocking structures

Above and below earth's surface

Conflicts between overlapping land uses



Source: <http://weburbanist.com>

Introduction (2/3)

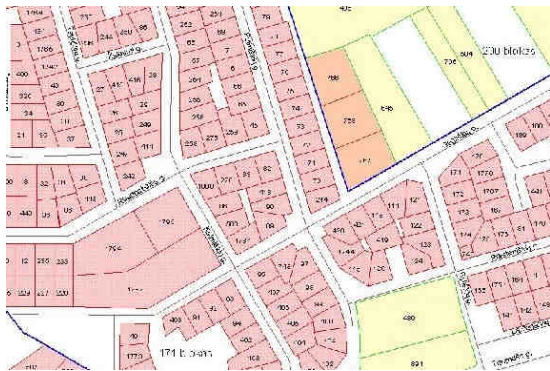
Law

- Regulates relations between individuals
 - Regulates relations between individuals and government
 - Promotes public benefit
-
- Vertical RRRs imposed on real property
 - Vertical restrictions on land ownership
 - Public Law Restrictions imposed on 3D space

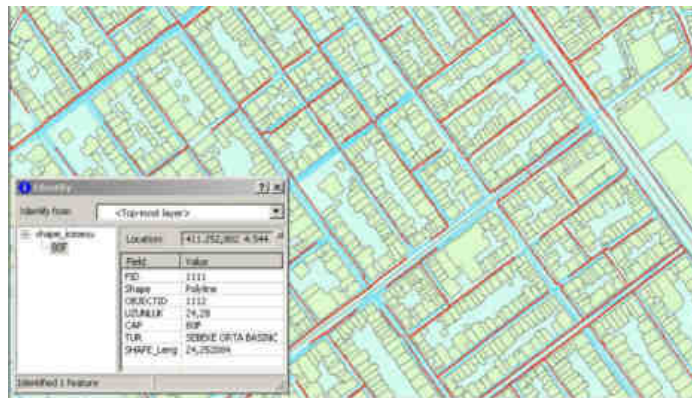
Introduction (3/3)

Cadastral

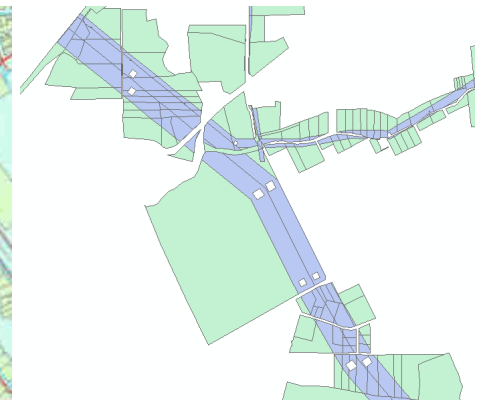
- Record specific rights, restrictions
- 2D recording
- Integrated or individual systems of specific PLRs' recording



Source: v. Oosterom et al., 2013



Source: Doner et al., 2010



Source: National Cadastre and Mapping Agency (NCMA) Greece

Paper's aim

- ✓ Identify and present PLRs applying to 3D space
- ✓ Presentation of relative cases within Greek legislation

Public Law Restrictions (1/9)



Source: http://k-associates.com/db/works/77_104.jpg



<http://kurld.com>



Source:
<https://wn.com/pollution>



Source:
<https://photos.travelblog.org>



Source:
<http://www.mayan-yucatan-traveler.com>



Source:
<http://www.yorkarchaeology.co.uk>



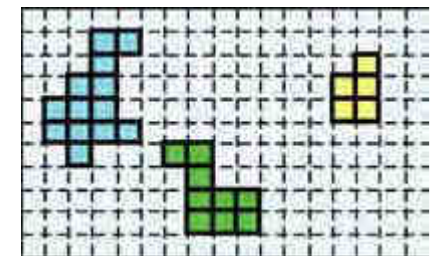
<https://sourceable.net>

Public Law Restrictions (2/9)

Mines

- Mineral rights distinct from land parcel ownership
- Restrictions on surface parcel ownership
- State owned – Land owner minerals
- Mining Cadastres

Quadrangular polygons
2D coordinates system



Source: World Bank, 2009



Source: <http://securityadvisors.com>

Public Law Restrictions (3/9)

Archaeology

- Restrictions/responsibilities
- Buffer zones
- Servitudes
- Expropriation
- Land use restrictions
- Restrictions in buildings' construction, restoration, alteration
- Restrictions in maritime activities



Public Law Restrictions (4/9)

Environment

- Waste management
- Pollution
- Marine space management
- Groundwater protection

3D aspects

- ✓ Location factors
- ✓ Existence of groundwater
- ✓ Geological-hydrogeological conditions
- ✓ Nature and cultural patrimony protection

- ✗ Variety of factors
- ✗ Depend on each development's characteristics

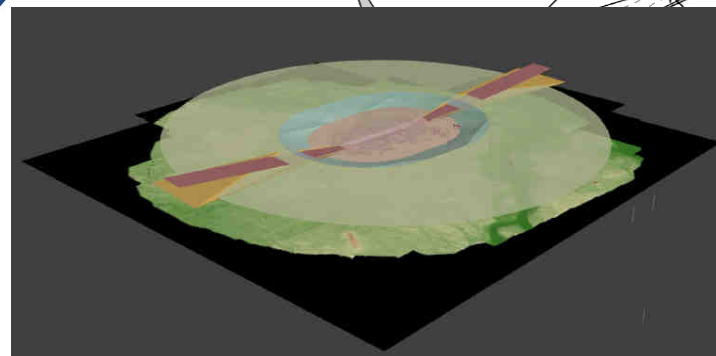
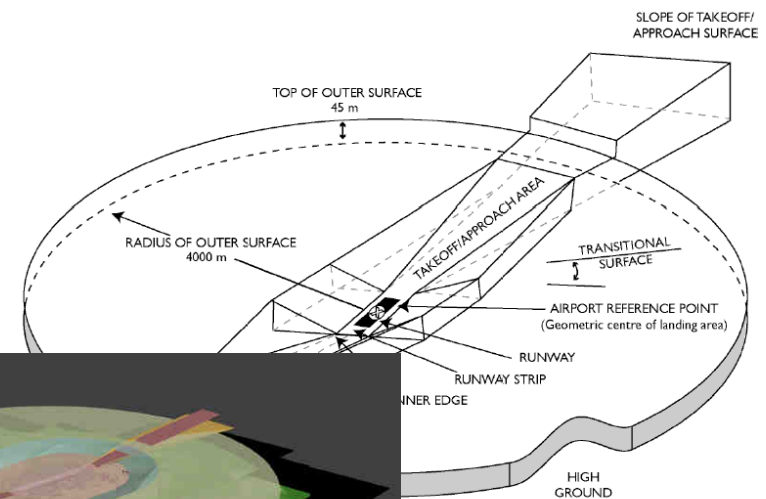
Public Law Restrictions (5/9)

Civil Aviation

1. Non military manned air vehicles

- Definition of no flight zones
- Definition of minimum flight height
- Definition of Obstacle Limitation Surfaces (OLS)

- Latitude, longitude
- Allowed airspace flight height



<http://www.priorityonejets.com>

Source: <http://gis.icao.int>

Public Law Restrictions (6/9)

- Similar characteristics with manned air vehicles
- Need of further restrictions
- Variable conditions



Source: <https://a2ua.com>

2. Unmanned Air Vehicles (UAV)

- Public assemblies
- Hunt areas
- Emergency operations areas

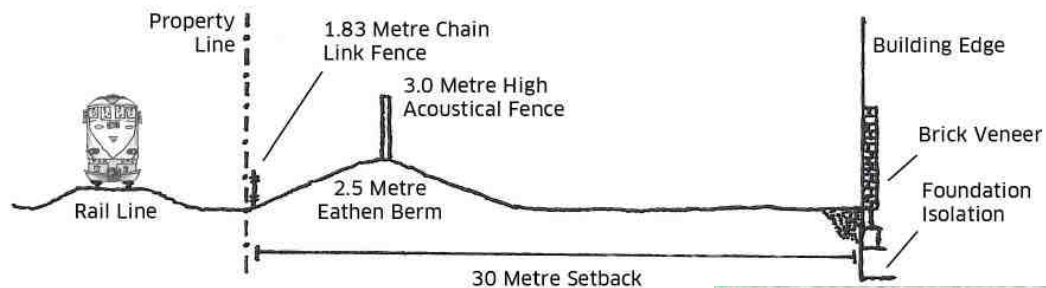
- Permission above specific heights
- Prohibition over specific facilities
- Maximum flight height

Public Law Restrictions (7/9)

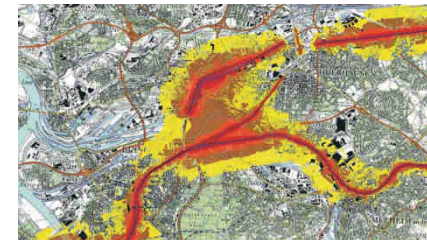
Urban Planning and Construction

1. Urban planning

- Land use
- Infrastructure and development
- Special economic policies
- Transport
- Education
- Energy consumption
- Public investments
- Environment
- Traditional architecture preservation



Source: Guidelines for New Development in Proximity to Railway Operations, 2013



Source: <http://www.soundplan.com>



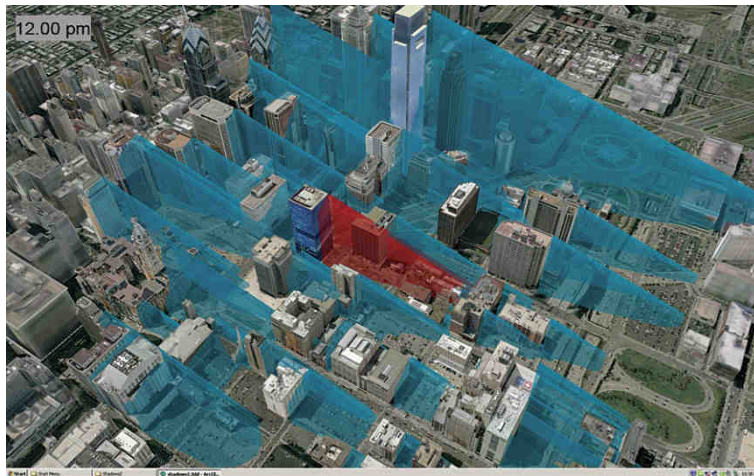
Source: Greater London Authority, 2012

Public Law Restrictions (8/9)

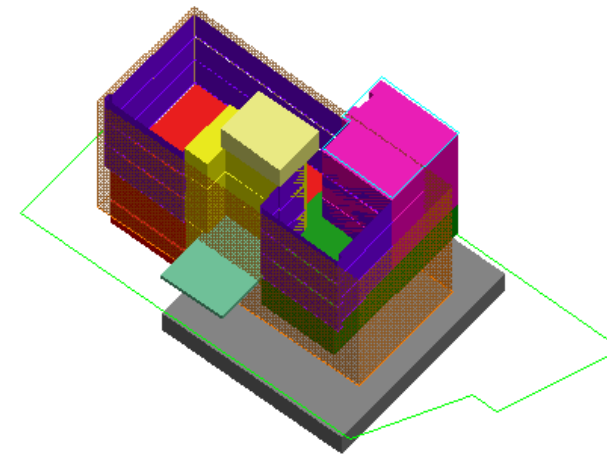
Urban Planning and Construction

2. Construction regulations

- Permitted building height, land cover ratio
 - Regulations on lighting, ventilation, solar exposure
 - Interrelation with neighbouring buildings
 - Protection of traditional architectural characteristics (e.g. *façades*)
-



Source: <http://www.esri.com>



Source: Kitsakis and Dimopoulou, 2014

Public Law Restrictions (9/9)

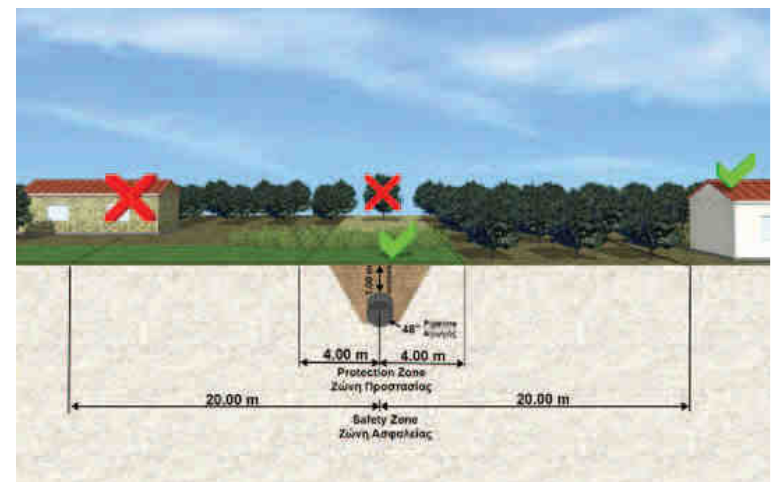
Utilities

- Utility servitudes
- Specific legislation
- Restrictions along underground pipeline's centre line

- ✘ Buildings' height,
- ✘ Buildings' depth
- ✘ Types of cultivation



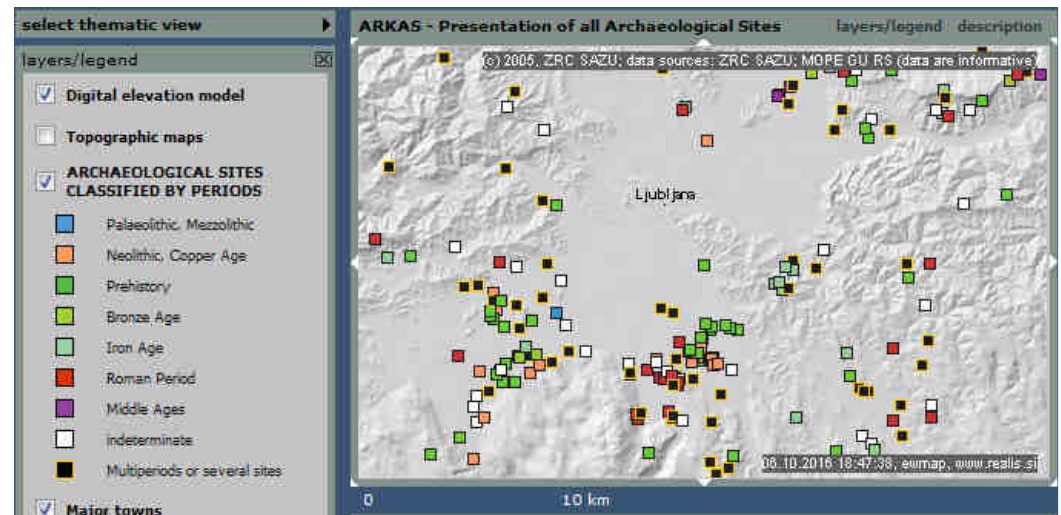
Source: <http://greeklandscapes.com>



Source: www.tap-ag.gr

Recording PLRs (1/2)

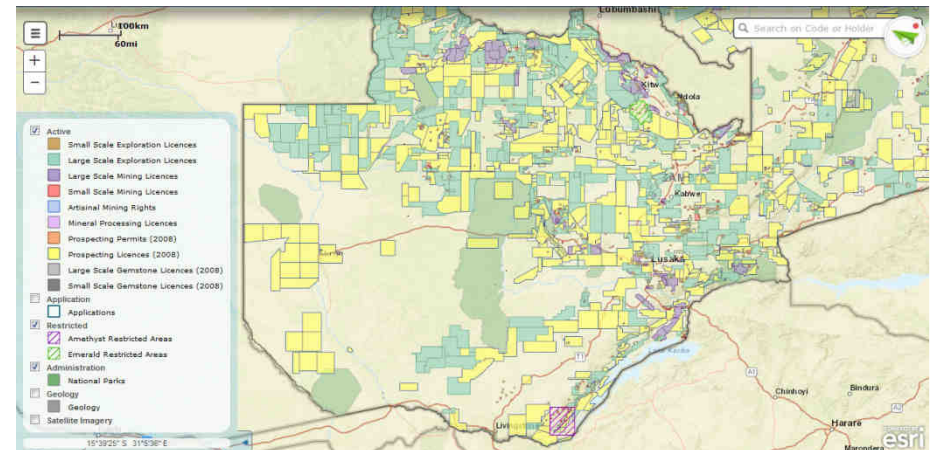
- *Separate registries*
 - Archaeological Cadastres
 - Utility Cadastres
 - Contaminated sites
 - Protected areas
 - ...



Source: <http://gis.zrc-sazu.si/zrcgiseng/>

- Unified registries
- Notification on Land Cadastres
- *PLR Cadastres*

- ✗ 2D maps
- ✗ Limited number of PLRs recorded
- ✗ No reference on vertical restrictions



Source: <http://portals.flexicadastre.com/zambia/>

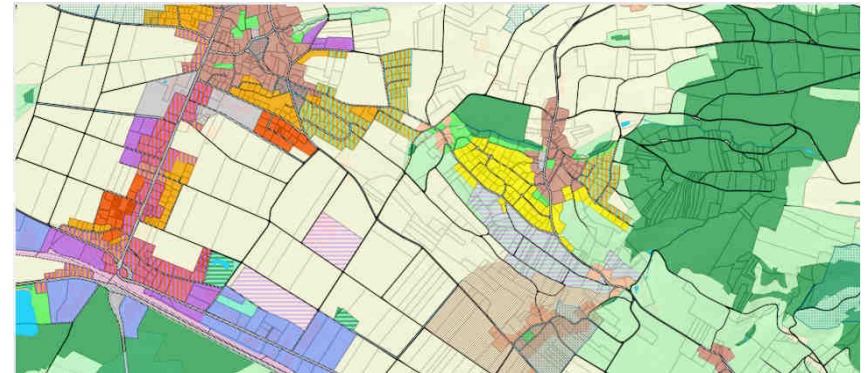
Recording PLRs (2/2)

PLR Cadastres

- Present all PRLs imposed on land
- Presentation as 2D polygons in 2D maps
- Height restrictions by accompanying legal documents

“Charte d’éthique de la 3D”

- ✘ 2D based legislation
- ✘ Complexities performing spatial analysis



Source: <http://oereb.tg.ch/>



Source: <http://xgis.maaamet.ee/xGIS/XGIS>

3D PLRs in Greek Public Law (1/4)

Background

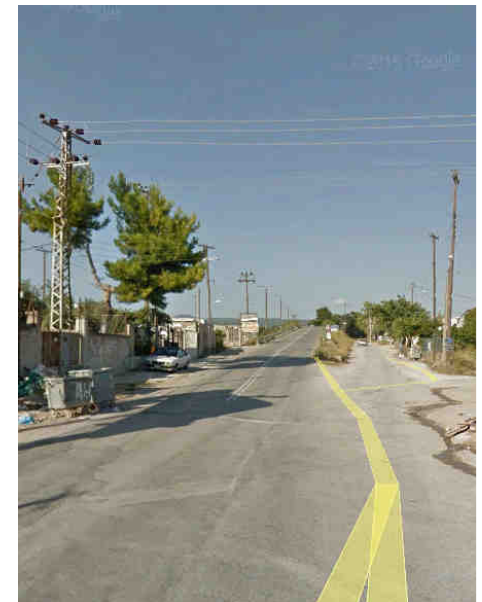
- Ongoing Hellenic Cadastre project
- No provision for PLR recording
- No 3D recordings
- Principle of “open” Cadastre

Examined cases

-Urban planning and construction restrictions

-Establishment of no-flight zone

- Above ground powerline



3D PLRs in Greek Public Law (2/4)

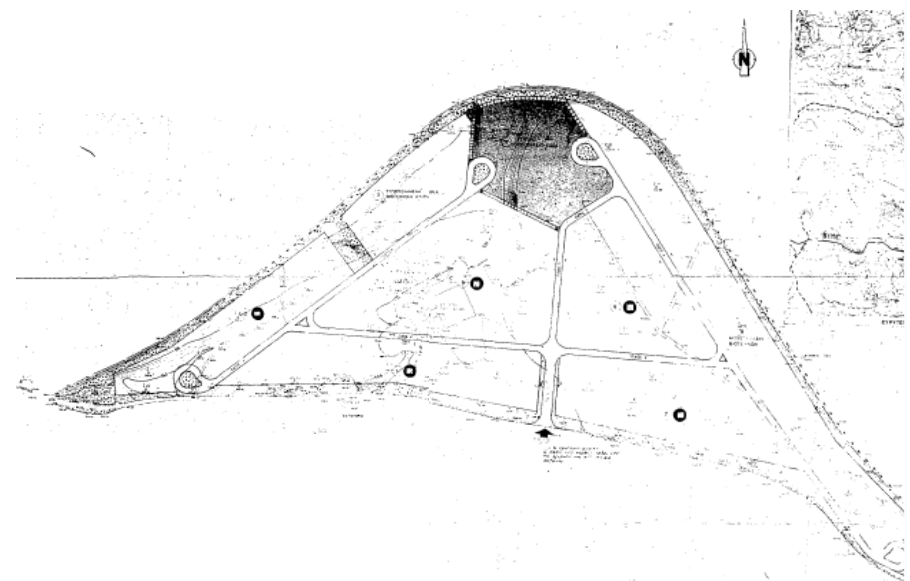
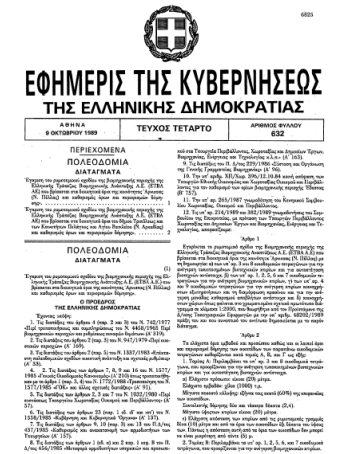
Urban planning and construction restrictions

- Building restrictions defined by Presidential Decree
- 2D area and land parcel boundaries delimitation

- Built-surface ratio
- Minimum land parcel size
- Maximum building height



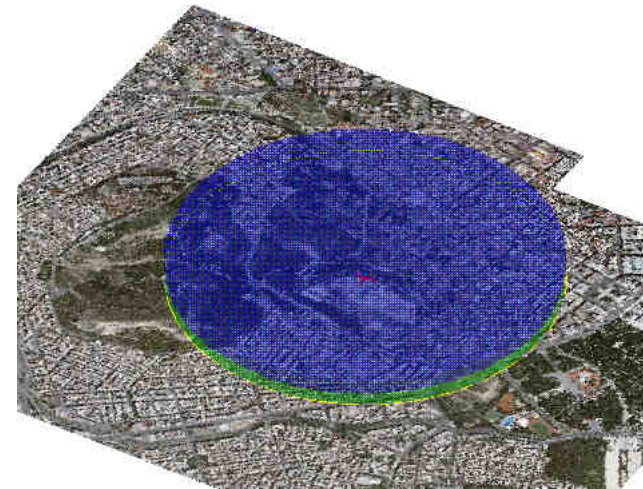
Source: Gatsogianni, 2016



3D PLRs in Greek Public Law (3/4)

Establishment of no flight zone

- Circular no flight zone
- East/North circle's centre coordinates
- Flight height restrictions



Άρθρο 2
ΑΠΑΓΟΡΕΥΜΕΝΗ ΠΕΡΙΟΧΗ
Καθορίζεται ως Απαγορευμένη Περιοχή η περιοχή γύρω από την Ακρόπολη των Αθηνών (LGF ACROPOLIS) για λόγους προστασίας των αρχαιολογικών μνημείων, ως κατωτέρω:
Κύκλος με κέντρο τις συντεταγμένες 375820N 0234333E και ακτίνα 700 μέτρων.
(Circle of 700 meters radius, centered on 375820N 0234333E):
α) Ελικοφόρα αεροσκάφη (propeller aircraft): από έδαφος έως και 5000 πόδια.
β) Αεροσκάφη τύπου JET: από έδαφος έως και 10.000 πόδια.
Στην ως άνω Περιοχή είναι απολύτως απαγορευμένη η πραγματοποίηση πτήσεων.

Άρθρο 3
Η ισχύς του παρόντος διατάγματος αρχίζει από τη δημοσίευσή του στην Εφημερίδα της Κυβερνήσεως. Στον Υπουργό Μεταφορών και Επικοινωνιών αναθέτουμε τη δημοσίευση και εκτέλεση του παρόντος.

Αθήνα, 19 Ιανουαρίου 2007
Ο ΠΡΟΕΔΡΟΣ ΤΗΣ ΔΗΜΟΚΡΑΤΙΑΣ
ΚΑΡΟΛΟΣ ΓΡ. ΠΑΠΟΥΛΙΑΣ
Ο ΥΠΟΥΡΓΟΣ
ΜΕΤΑΦΟΡΩΝ ΚΑΙ ΕΠΙΚΟΙΝΩΣΕΩΝ
ΜΙΧΑΗΛΣ ΛΙΑΠΗΣ



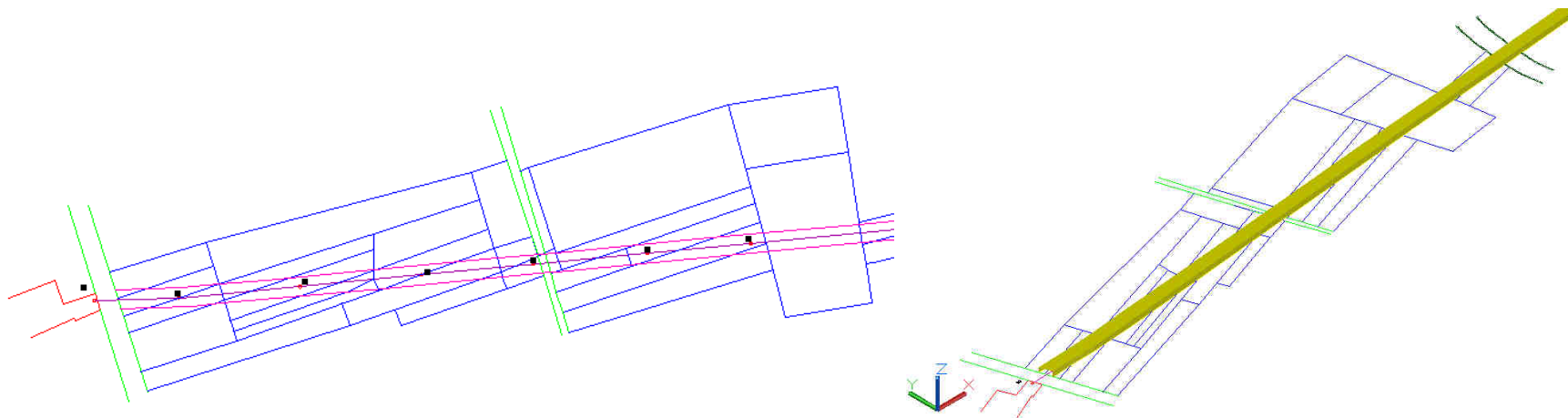
- Combination with UAS regulation
- Combination with building restrictions

✓ Accurate information of permissible building space

3D PLRs in Greek Public Law (4/4)

Public Utilities

- Above ground powerline
- Expropriation
- Servitude of passage (along centre-line)
- Height restrictions



Conclusions and further research (1/2)

Conclusions

- Variety of PLRs in 3D
- Influence by various factors
- Use of themed or PLR Cadastres
- 2D polygon projections
- Height restrictions (legal documents)

- ✘ Different legal resources
- ✘ Operation within 2D cadastral context
- ✘ Ambiguities in presentation and interrelation
- ✘ Conflicts in 3D space

Conclusions and further research (2/2)

- ✓ Clarification of complex restrictions
 - ✓ Exact restrictions' delimitation
 - ✓ Encumbrance of 3D space
 - ✓ Efficient 3D space exploitation
-

Further research

- Definition of PLRs requiring 3D definition
- 3D data accuracy and update
- Arbitration processes in 3D space
- Definition of ownership right's content

Thank you !

