

**Nikola Vučić**, Miodrag Roić, Mario Mađer, Saša Vranić  
University of Zagreb, Faculty of Geodesy  
DEMLAS project

# Overview of Legal and Institutional Aspects of Croatian Cadastre and Possibilities for its upgrading to 3D



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# INTRODUCTION

- A more extensive use of land administration information began with the development of multipurpose cadastres.
- It was only the development of information technologies that really opened up the possibilities for development of Multipurpose Land Administration Systems (MLAS).
- The differences between systems for registering land and systems for registering land tenure do not allow for a unified approach among countries



# INTRODUCTION

- The possibilities of new technologies are also constantly increasing.
- Cadastral data are basic data for land administration system. Their availability in a digital form makes them interesting to an increasing number of new areas of human activity and they become essential for their further development. That leads to a constant increase in the demand for cadastral information.



# LEGAL ASPECTS OF CROATIAN 3D CADASTRE

- The current system of registers in the Republic of Croatia is significantly vertically structured.
- Spatial data and data about real property in Croatia are managed in multiple registers with many end users. Basic registers are Cadastre and Land book.
- Responsible institutions of public authority are the State Geodetic Administration (for the Cadastre) and municipal courts (for Land Book). In cadastral offices (20 regional cadastral offices with their 92 branches and the Municipal Office for Cadastre and Geodetic Works of the City of Zagreb



# Regional cadastral offices (20)



# LEGAL ASPECTS OF CROATIAN 3D CADASTRE

- The cadastral data on the real property (cadastral parcels) is the basis for the establishment, renewal, keeping and maintenance of land books that are kept in 109 land book offices. In land book, the data on cadastral parcel title holders is associated to the data on cadastral parcels defined by the cadastre.
- Real property in Croatian real property law is, according to the [superficies solo cedit principle](#), a land surface parcel to include everything relatively permanently associated with this parcel on or below the land surface (primarily buildings, houses, etc.)..



# LEGAL ASPECTS OF CROATIAN 3D CADASTRE

- Croatian Land Administration System (LAS) is registering 3D cadastral objects related to constructions (buildings, pipelines, tunnels).
- **Infrastructure objects... including public utility infrastructure**
- Right of construction in legal terms is equal to the definition of real property.





# SURVEYING DESIGNS (Construction law)

- Production of Surveying Designs for the construction and physical planning as well as production of Utility Cadastre Report (for the public utility infrastructure) requires the use of Technical specifications for determining coordinates in coordinate system of the Republic of Croatia. These specifications prescribe correct ways of measuring and writing/expressing **3D coordinates** in analogue and digital form for cadastral purpose (land, real property and utility cadastre) as well as detailed topographic surveying, preparation of geodetic bases and all other georeferenced views.

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GEODETSKA SITUACIJA GRAĐEVNE

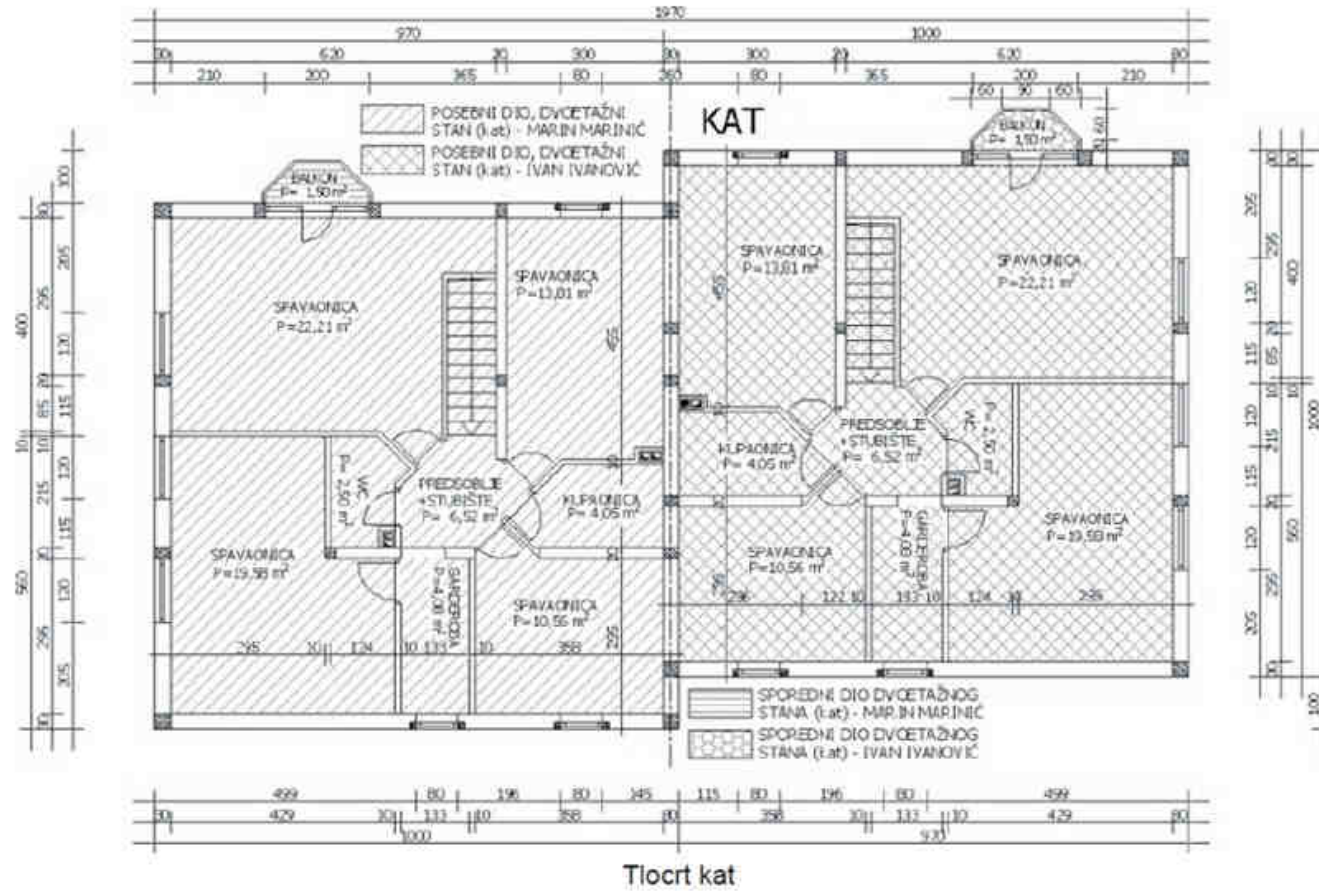


# BUILDINGS AND SEPARATE PARTS OF REAL PROPERTY



- Elaborate on partition of real property establishes size and shape of common and separate parts of a single real property (apartment, office space, etc.) and draws connections for reference purposes against the real property as a unit. Additionally, data about particular parts must be technically processed providing drawings of particular and common parts with required labels and areas of particular parts. These drawings are provided in analogue format. Shared ownership contract must also be provided.
- Regulation of connecting Land book and the Book of deposited contracts (Republic of Croatia - Official Gazzette 2010)





- Elaborate on partition of real property (Tušinec 2005)

# UTILITY CADASTRE



- Pursuant to the current “Law on State Survey and Real Property Cadastre” (Official Gazette 16/2007), Utility cadastre registers remain under the jurisdiction of the bodies of local government.
- State Geodetic Administration (SGA) of the Republic of Croatia considered that physical registration of the utilities must be organized at national level in the Republic of Croatia. The proposed new Croatian Utility Cadastre when incorporated in Croatian Land Administration System should streamline the provision of essential services such as water, sewerage, electricity and communication network (<https://esavjetovanja.gov.hr/ECon/MainScreen?entityId=3020>, access to the site 27. August 2016.)



# LINK BETWEEN LEGAL AND INSTITUTIONAL ASPECTS OF 3D CADASTRE

- STUDY OF THE BUILDING CADASTRE (source: [www.dgu.hr](http://www.dgu.hr))
- IMPLEMENTATION OF THE JOINT INFORMATION SYSTEM (**JIS**) OF LAND BOOK AND CADASTRE
- Establishment of JIS accelerates registration of real property in both cadastral and Land Book system, raises the security level in the real property transactions, provides better management of both systems, streamlines business processes, improves customer relations, and increases the speed and quality of service.



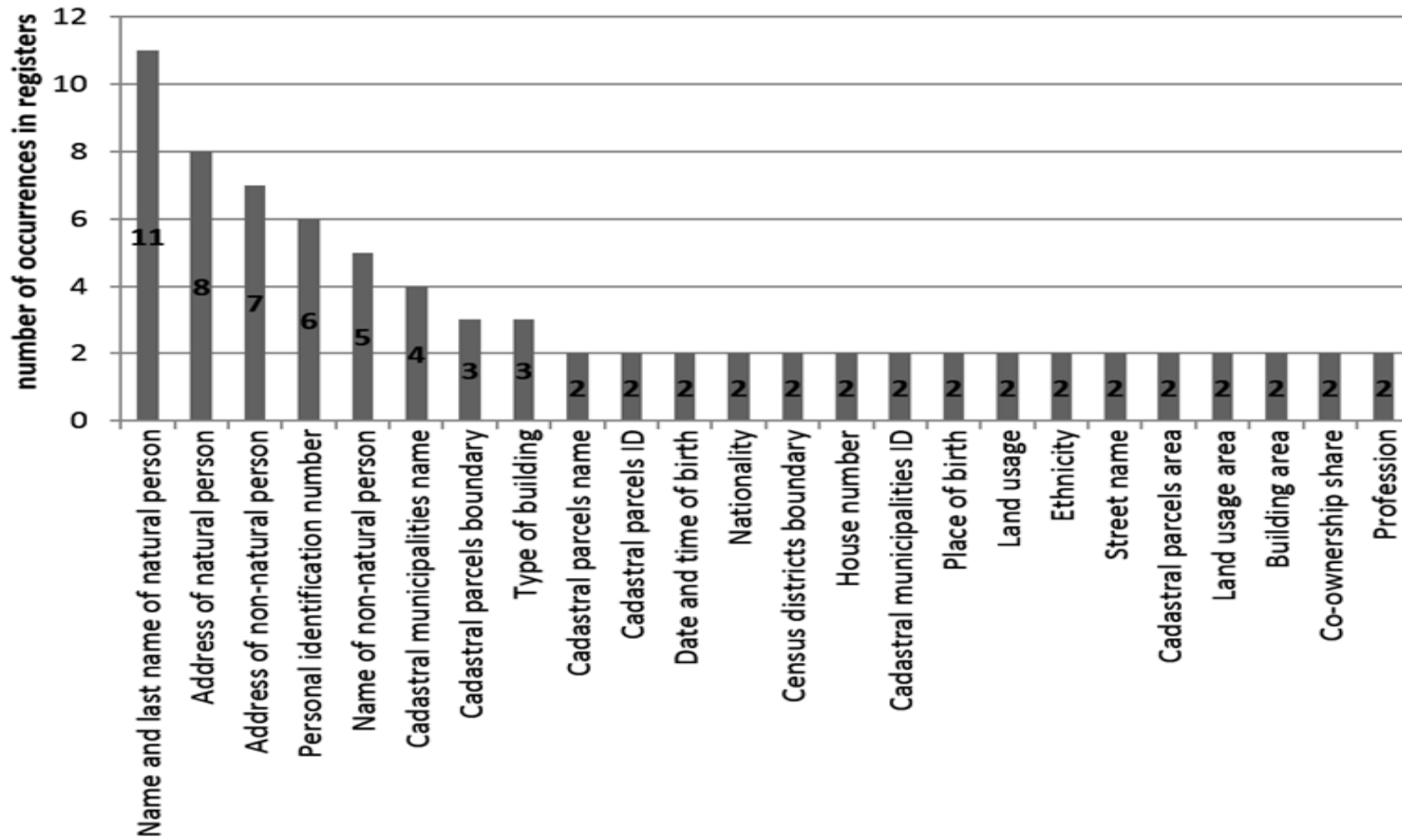
# CURRENT STATE OF CADASTRE RELATED DATA

<b>Register</b>	<b>Public authority</b>
Register of natural persons	Ministry of public administration
Registers of non-natural persons	Judicial authority
Register of personal identification numbers	Tax administration
Land book	Judicial authority
Cadastre	State Geodetic Administration
Register of spatial units	State Geodetic Administration
Utility cadastre	State Geodetic Administration

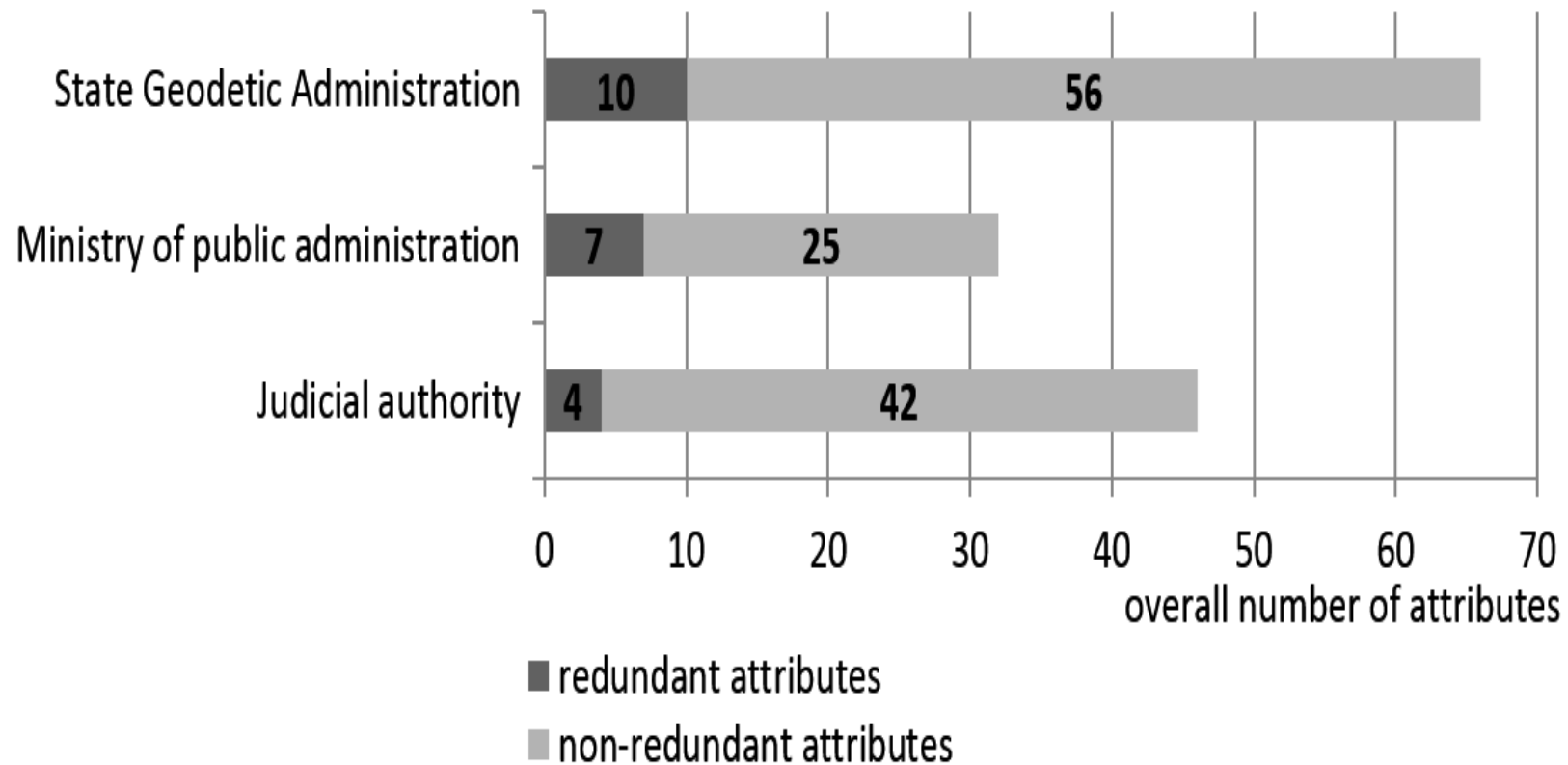




### Redundant data in the official registers (Mader et al. 2015)



### Redundancy at individual public authority (Mađer et al. 2015)





- Significant amount of this redundant data is natively maintained by the individual public authority
- Appropriate linking of registers would eliminate data redundancy and achieve significant savings in time, people and financial resources used for redundant and unnecessary multiple recording of the same data in different registers.
- => legal security and the availability of high quality and always up to date data.

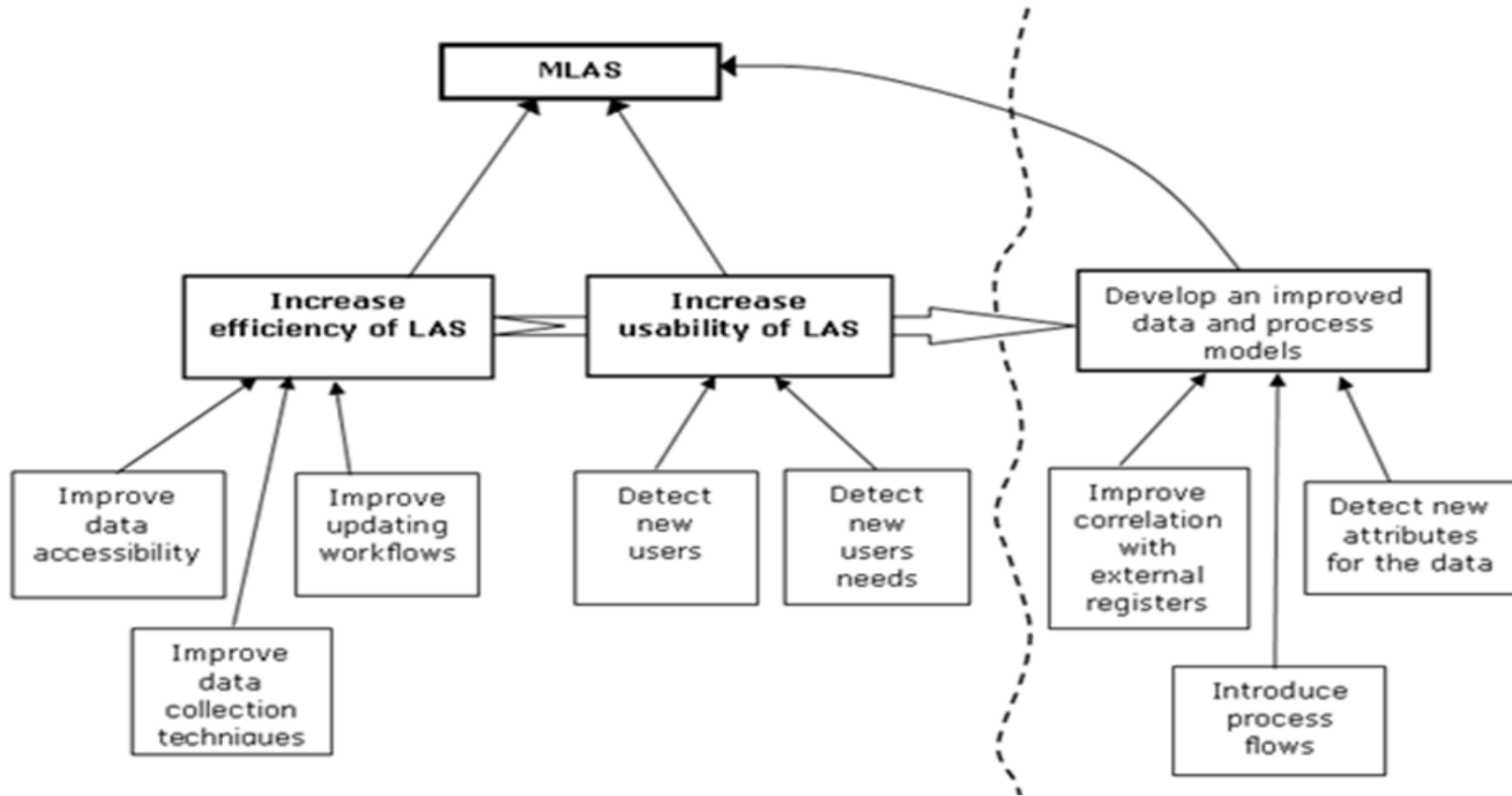


# PRECONDITIONS FOR ESTABLISHMENT OF 3D MULTIPURPOSE LAS

- Required to increase efficiency and usability of LAS.
- The ability of LAS to update its data quickly whilst ensuring the consistency and correctness thereof.
- Usability of LAS is also very important.
- Besides the mere registration of the land, multipurpose LAS must be able to efficiently support processes of land valuation, urban planning and various rearrangements aiming to increase agricultural productivity of the land. By increasing its efficiency and its usability a land administration system can be transformed into a multipurpose land administration system



### Transformation from LAS to MLAS



## MLAS: Survey (data collection on the field)



# INSTITUTIONS AND RECOMENDATIONS FOR ESTABLISHING 3D CADASTRE

- National Mapping and Cadastral Agencies (NMCA).
- Ministry of Finance
- Financial resources to establish a 3D cadastre should be prescribed by law in a way that citizens, entrepreneurs and investors have benefits directly from the 3D cadastre.
- It should take into account the real limits of performance and find the way how to motivate citizens and legal persons to register their property in the 3D cadastre, using past experience in the field of land administration.



# CONCLUSION

- For establish a complete 3D cadastre the important step is to register all buildings and structures (especially bridges, tunnels, overpasses, underpasses, traffic infrastructure, underground buildings etc.) as well as underground and over-ground public utility infrastructure.



# CONCLUSION

- It is especially important to improve legal and institutional framework that will enable registration of properties in 3D form and adequately describe its separate parts. 3D property models suitable for implementation in a complete 3D cadastre can be made out of 2D geodetic data (mostly geodetic reports) or out of plans of separate parts of the properties.





# CONCLUSION – making a 3D cadastre

- Making gradual and well prioritization (big cities have more complex 3D situations than small towns and vilages).
- To determine priorities cost-benefit analysis of establishing 3D cadastre in a certain area is necessary.





# Thank you for your attention!

Nikola VUČIĆ  
University of Zagreb Faculty of Geodesy  
DEMLAS project

[nikola.vucic@gmail.com](mailto:nikola.vucic@gmail.com)



Faculty of Geodesy, University of Zagreb  
Chair of Spatial Information Management



**DEMLAS**

RAZVOJ VIŠENAMJENSKOG SUSTAVA UPRAVLJANJA ZEMLJIŠTEM  
DEVELOPMENT OF MULTIPURPOSE LAND ADMINISTRATION SYSTEM