

STATE GEODETIC ADMINISTRATION

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www.dgu.hr



LADM in the Republic of Croatia – making and testing country profile

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INTRODUCTION

- So far, similarities and differences between the existing Croatian land administration system and LADM have been investigated.
- Objective of this paper is to determine compatibility between Land Administration Domain Model and Croatian Land Administration System.

INTRODUCTION

- **Compatibility is determined with following questions:**
- What are users' requirements for the Croatian land administration system?
- Which LADM classes can be applied directly to the Croatian land administration system?
- Which LADM classes have to be modified to be suitable for the Croatian land administration system?
- How to design a land information system for the Croatian land administration system complying with LADM?

LAND ADMINISTRATION IN CROATIA

- **Dual system of real property registration**
 - Cadastre (20 regional cadstral offices with their 92 branches, and the Municipal Office for Cadastre and Geodetic Works of the City of Zagreb)
 - Land book (109 land book offices of 65 municipal courts)
- ***Superficies solo cedit* principle**
 - Real property is a land surface parcel to include everything relatively permanently associated with this parcel on or below the land surface (primarily buildings, houses, etc.).

Current situation of Land Administration in Croatia

- In addition to regular activities and numerous bilateral projects the most important part of land administration reform is Real Property Registration and Cadastre Project. Main objective of this project is to build an efficient land administration system in order to develop an efficient real estate market. Final Report of the Project provides information on compliance two state registers for the period 2003-2010:
- completely harmonized data on the 5% of the state
- 5.56% harmonized cadastral parcels in the state
- 2.63% cadastral municipalities harmonized data
- 3.67% harmonized cadastral parcels by the geodetic elaborate
- in progress is the public presentation of cadastral surveys and land restoration book for 2 % cadastral municipalities
- in progress is the cadastral survey for 4.36% of cadastral municipalities.

Cadastral parcel information

No.	Name	Description
1	Cadastral parcel identifier	Uniquely identified for each cadastral parcel. It consists of an identification number of the cadastral municipality or cadastral region at sea and the parcel number. Sometimes cadastral parcel number in the cadastre may be different than the cadastral parcel in the land book (old and new cadastral survey for one cadastral municipality, when new cadastral survey is not recorded in land book).
2	Area	In last 6 years there are no differences between cadastral parcel area on the map, on the field and in the document for new made parcels, because of good legislation (article 74. of Law on state survey and the real property cadastre). But older data may have those differences because of respecting registered areas, measured and calculated by old geodetic instruments and methods.
3	Duration of land use	Property - permanently, to the legal transactions or inheritance. Usufruct - a period of time. Lease - a period of time.
4	Land use type	Data on land use type is required by law and implemented in the current information system.
5	Legality of the building	Cadastre is one of key institution in the process of controlling legality of the buildings which are built on the cadastral parcels.
6	Land prices	Not directly in the system of land administration (cadastre and land book). Jurisdiction of the Ministry of Finance.
7	Land restrictions	Data regarding to land restrictions are provided for cadastral parcels in some cases such as cannot sell a house (for ten years period) rebuilt with the program for renovated houses that were destroyed in the war.

Person information

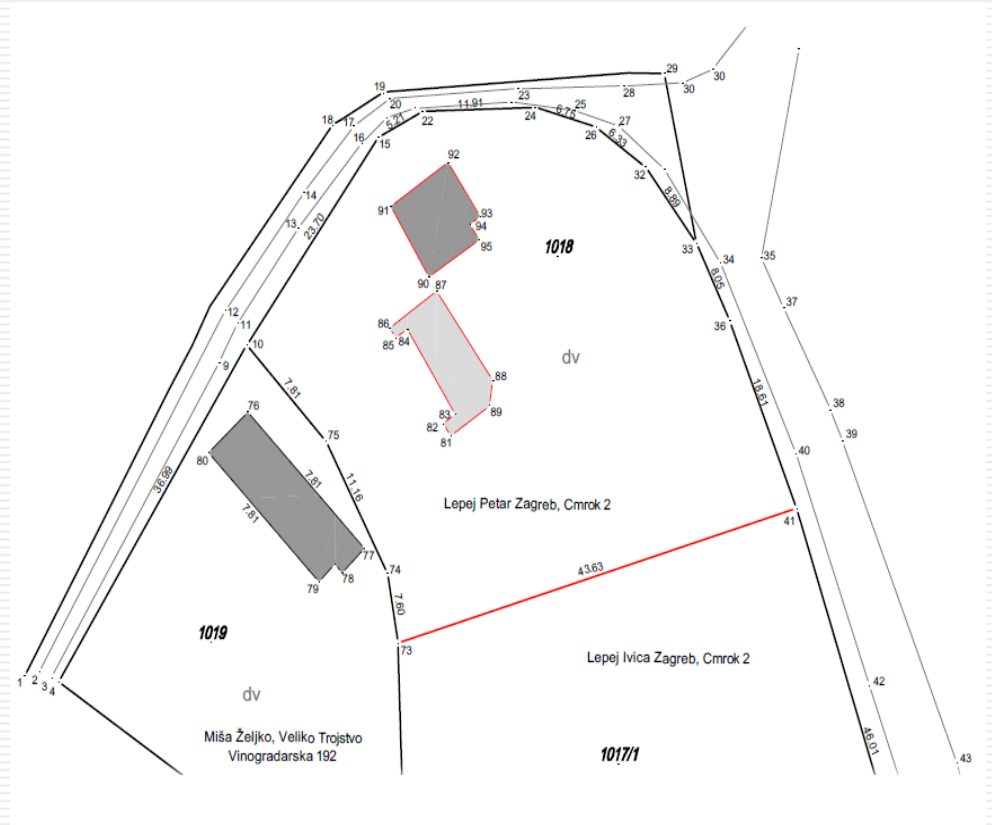
- **Land managers'**
 - Organizations
 - Authorized companies

- **Land users'**
 - Natural persons
 - Legal persons
 - Groups

No.	Type	Information
1	Natural person	Name, permanent address, unique person identifier of Ministry of Finance
2	Legal person	Name, permanent address, unique person identifier of Ministry of Finance
3	Group	Name of ex. "Land community", permanent address

Buildings and other structures

- Buildings and other structures are registered in the cadastre with the following attributes: area, intended building use, building name, and house number.
- Land book adopt cadastral data and register listed two-dimensional data about real property parts. Real property may be further divided into common and particular parts and registered in the land book based on the report on partition of real property.



Public utility networks

- Utility cadastre contains data about type, purpose, basic technical features, and the location of built utility lines, and it lists the names and addresses of their managers.



Surveying, gravimetric and map information

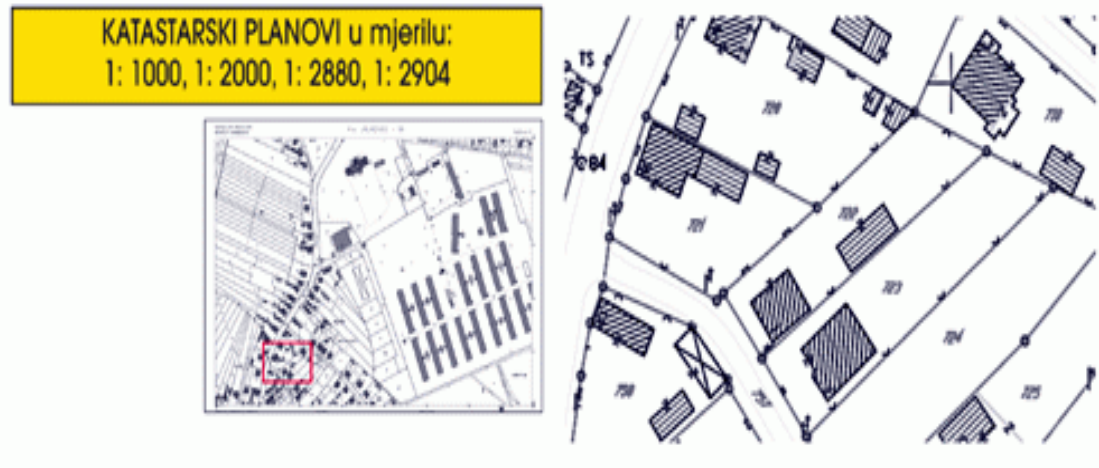
- From 2004, the Croatian Terrestrial Reference System (HTRS96) was defined as a **new** positional system – Croatian realization of ETRS89 (European Terrestrial Reference System 1989).
- The **new** vertical system of the Republic of Croatia – HVRS71 (Croatian Vertical Reference System 1971) is determined by the geoid datum defined by the mean sea level for the epoch 1971.5 on five tide gauges equally distributed along the Adriatic coast (Dubrovnik, Split, Bakar, Rovinj and Kopar).
- The materialization of gravimetric reference system is made up of fundamental gravimetric network consisting of 6 absolute gravimetric points and 36 points of the first order gravimetric network, and this reference system was named as the Croatian Gravimetric Reference System 2003

Surveying, gravimetric and map information

- The Decree on establishing new official geodetic datum and map projections for the Republic of Croatia stipulates that the transverse aspect of Mercator's (Gauss-Krüeger) projection with the mean meridian 16° and $30'$ and with linear scale of 0.9999 is determined to be the official map projection of the Republic of Croatia for the field of cadastre and detailed state topography.
- The Lambert conformal conical projection with defined standard parallels $43^{\circ} 05'$ and $45^{\circ} 55'$ is determined as official map projection for the needs of general state cartography. Both projections are based on the GRS80 ellipsoid as the mathematical model, i.e. the HTRS96 reference system.

Cadastral maps

- Croatia has:
- 3346 cadastral municipalities,
- 55867 cadastral maps,
- 14.428.790 cadastral parcels.



Geoportal - preglednik podataka - Mozilla Firefox
 geoportal.dgu.hr/preglednik/?fsb=false

Mjerilo 1 : 1000

Sadržaj Pretraga

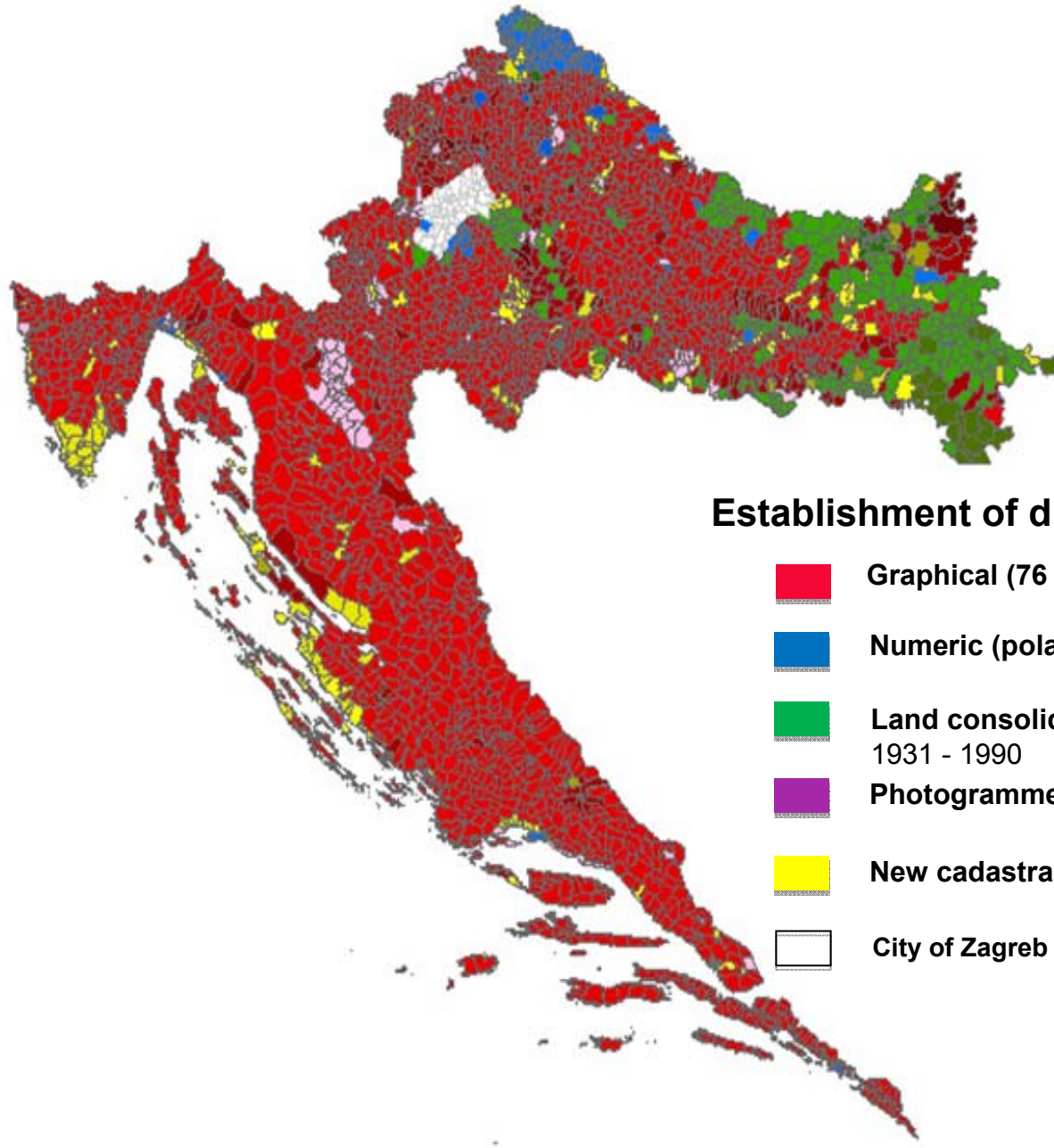
- Digitalna ortofoto karta
 - DOFS
 - Toponimi
 - DOFS - podjela na listove
- Hrvatska osnovna karta
 - HOK5
 - HOK5 - podjela na listove
- Topografska karta
 - TK25
 - TK25 - podjela na listove
- Središnji registar prostornih jedinica
 - Županije
 - Gradovi i općine
 - Naselja
 - Mjesna samouprava
- Digitalni katastarski plan
 - Područni uredi za katastar/spostave
 - Katastarske općine
 - Čestice
 - Zgrade
 - Kućni broj
 - Nazivi
 - Prikaži samostalno sloj DKP
- Generalizirani sadržaj M 1:1 000 000
 - Ceste
 - Željezničke pruge
 - Trajektna pristaništa
 - Zračna luka/aerodrom
 - Jezera/izvori
 - Vodotok > 10-20 m i < 500 m
 - Vodotok >= 500 m

Pregledna karta







Koordinate (HTRS96): E = 526586.7, N = 4736209.5 | $\varphi = 42.765166$, $\lambda = 16.824851$

<http://geoportal.dgu.hr> (old cadastral map – vectorized, digital orthophoto in underlying)

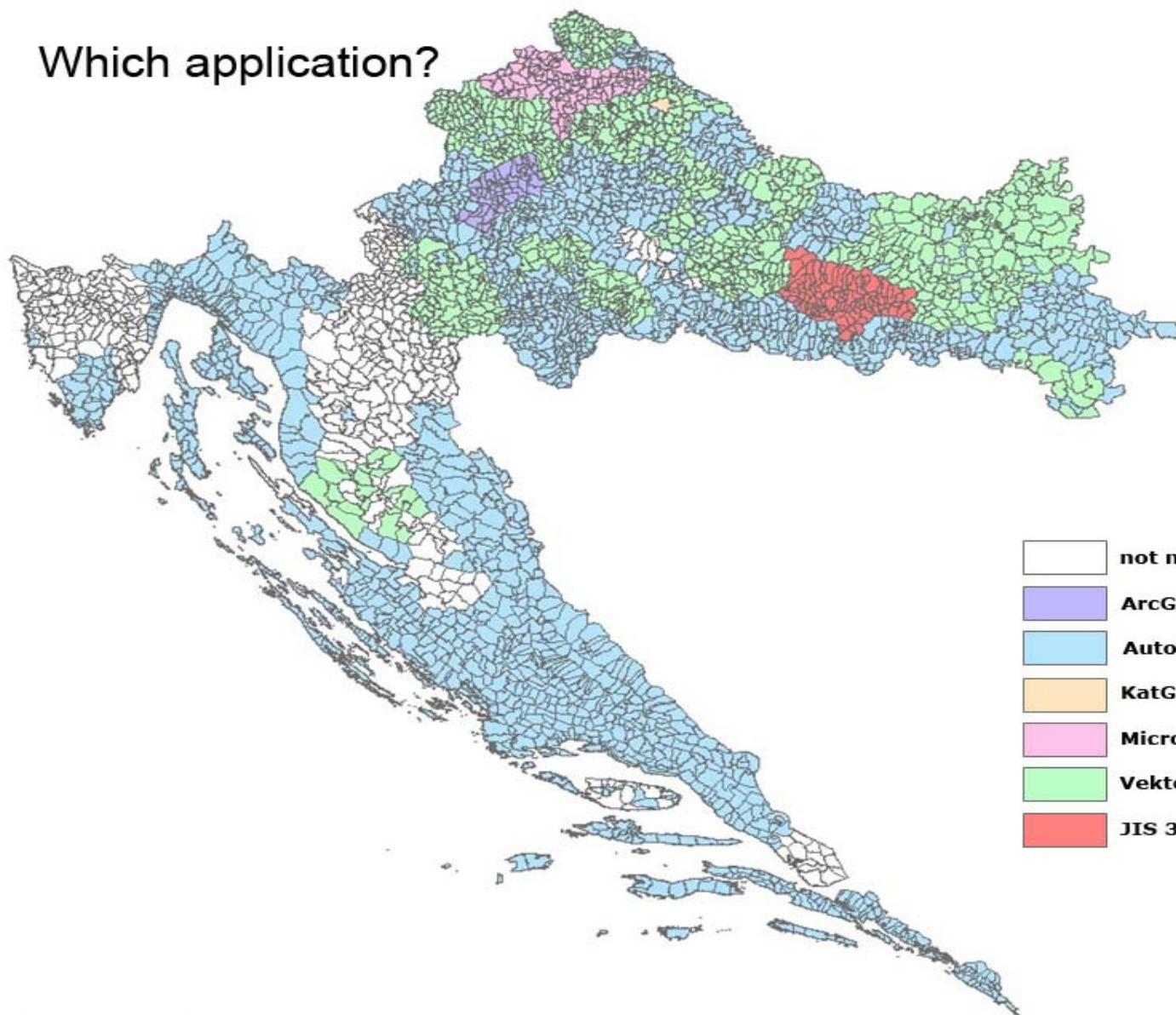
**All cadastral maps
are vectorized and
stored in the Digital
Cadastral Map
Central Database**



Establishment of digital cadastre map

-  **Graphical (76 %): 1818 - 1928**
-  **Numeric (polar, orthogonal) (3%): 1930 - 2000**
-  **Land consolidation (9 %):
1931 - 1990**
-  **Photogrammetric (4 %): 1956 - 2000**
-  **New cadastral survey (harmonized data) (8%): 2000 - ...**
-  **City of Zagreb**

Which application?



	not maintained 13%
	ArcGIS 2%
	AutoCad 53%
	KatGis 1 cadastral municipality
	MicroStation 3% (Varaždin county)
	Vektoria 26%
	JIS 3%

Source: www.dgu.hr 20.10.2013. Conference DGU & HKOIG

LAND ADMINISTRATION DOMAIN MODEL (LADM)

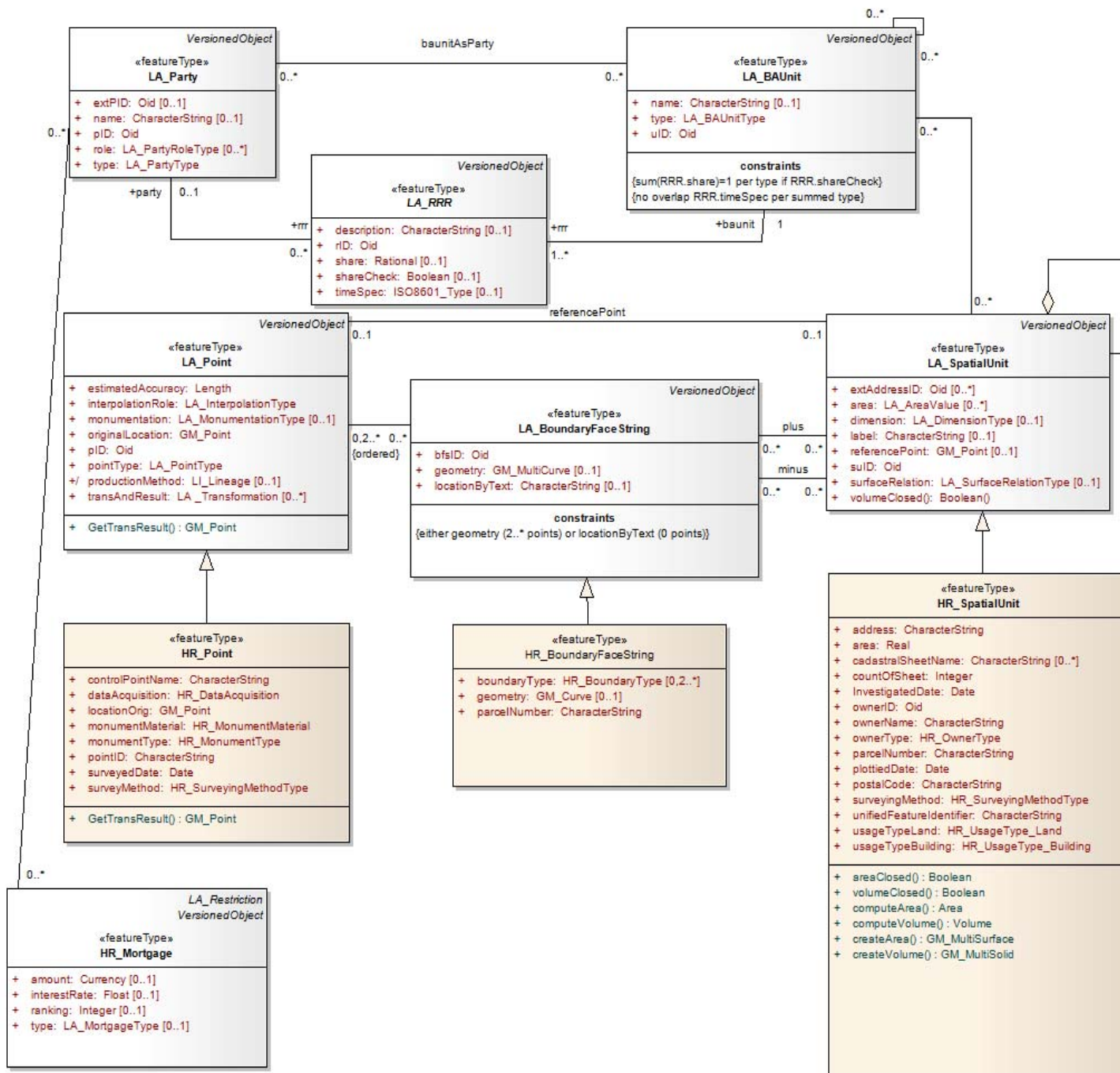
- LADM can be extended and adapted to local situations; in this way all People to Land relationships may be represented. This can be supportive in the development of software applications built on database technology.
- LADM describes the data contents of land administration in general. Implementation of the LADM can be performed in a flexible way; the standard can be extended and adapted to local situations.

COUNTRY PROFILE CROATIA

- First version of Croatian country LADM profile was developed 2012. It is based on LADM and adds some new classes, attributes and types to the code list (to differentiate LADM in Croatia from other models, their names are given with HR_ as prefix).
- The land administration institutions in Croatia decided not to get merged into one institution but opted for a unique Croatian solution of linking the institutions at the level of data and business processes to be maintained according to respective jurisdictions. This solution is Joint Information System (JIS) of the Land book and Cadastre
- The JIS technical solution enables IT communication with the basic State registers: databases comprising the data on OIB (Personal Identification Number), spatial data register, State Geodetic Administration (SGA) Geoportal, SGA digital archives and will be linked to the One Stop Shop system.

Joint Information System

- **Implementation of the JIS will have following benefits:**
- integrated cadastre and land book data - a unique land database
- integrated graphical and alphanumeric data
- single centralized application for all cadastral and land book offices
- inimitable data maintenance
- avoiding the generation of copies of data due to different applications at cadastral and land book offices
- integration with the Geoportal and the ability to view digital ortho-photo data
- integration with the Register of Spatial Data
- JIS is process-oriented application, accelerating business processes and increasing internal transparency
- the ability to review and edit graphical data
- digital signing of electronically generated documents as the basis for the electronic exchange and centralized printing
- integration with the VAT (value added tax) system.



Country profile Croatia

«codeList» HR_MonumentMaterial
+ concretePillar = 1
+ ironWedge = 2
+ ceramicPipe = 3
+ plasticMarkerWithAnIronCore = 4
+ carvingCrossInASolidRock = 5

«codeList» HR_SurveyingMethodType
+ canNotInvestigation = 0
+ graphicMethod = 1
+ coordinateMethodByLandSurvey = 2
+ coordinateMethodByAeroPhotogrammetry = 3
+ orthophoto = 4
+ coordinateMethodByCROPOS = 5
+ orthogonalMethod = 6

«codeList» HR_DataAcquisition
+ mapDigitizing = 1
+ surveyed = 2

«codeList» HR_BoundaryType
+ boundaryOfUsageType = 1
+ boundaryOfParcel = 2
+ boundaryOfCadastralMunicipality = 3
+ boundaryOfCommunityOrTown = 4
+ boundaryOfCounty = 5
+ boundaryOfState = 6

«codeList» HR_OwnerType
+ owner = 1
+ possessor = 2
+ unregisteredOwner = 3

«codeList» HR_ResponsibilityType
+ monumentMaintenance = 1
+ waterwayMaintenance = 2
+ snowRemoval = 3
+ icicleRemoval = 4

«codeList» HR_UsageType_Building
+ house = 101
+ residentBuilding = 102
+ mixed-useBuilding = 103
+ temporaryResidenceBuilding = 104
+ holidayHome = 105
+ orchardHouse = 106
+ vineyardHouse = 107
+ farmDwelling = 108
+ fisherman'sHouse = 109
- mountainLodge = 110
+ commercialBuilding = 111
+ hotel = 112
+ motel = 113
+ hostel = 114
+ restaurant = 115
+ rentalBuilding = 116
+ administrativeBuilding = 117
+ serviceBuilding = 118
+ buildingForReceptionOfPassengers = 119
+ sportsHall = 121
+ in-doorSwimmingPool = 122
+ stadium = 123
+ lighthouse = 124
+ publicBuilding = 125
+ sacralBuilding = 126
+ monument = 139
+ faculty = 128
+ school = 129
+ kindergarten = 130
+ hospital = 131
+ infirmary = 132
+ church = 133
+ chapel = 134
+ convent = 135
+ monastery = 136
+ synagogue = 137
+ mosque = 138
+ memorial = 140
+ industrialBuilding = 141
+ hydro-PowerPlant = 142
+ thermo-electricPowerPlant = 143
+ heatingPlant = 144
+ transformerStation = 145
+ gasStation = 146
+ hall = 146
+ openHall = 147
+ hangar = 148
+ container = 149
+ silo = 150
+ greenhouse = 151
+ tower = 152
+ garage = 153
+ shed = 154
+ woodShed = 155
+ storageFacility = 156
+ yardBuilding = 157
+ auxiliaryBuilding = 158
+ subterraneanBuilding = 159
+ subterraneanBusinessBuildig = 160
+ subterraneanGarage = 161
+ subterraneanShelter = 162

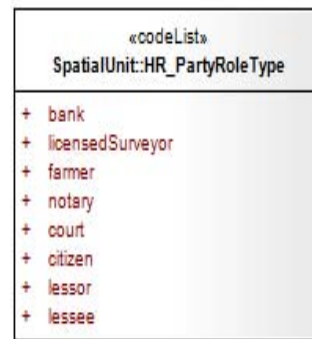
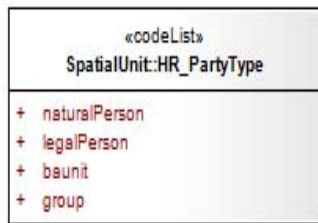
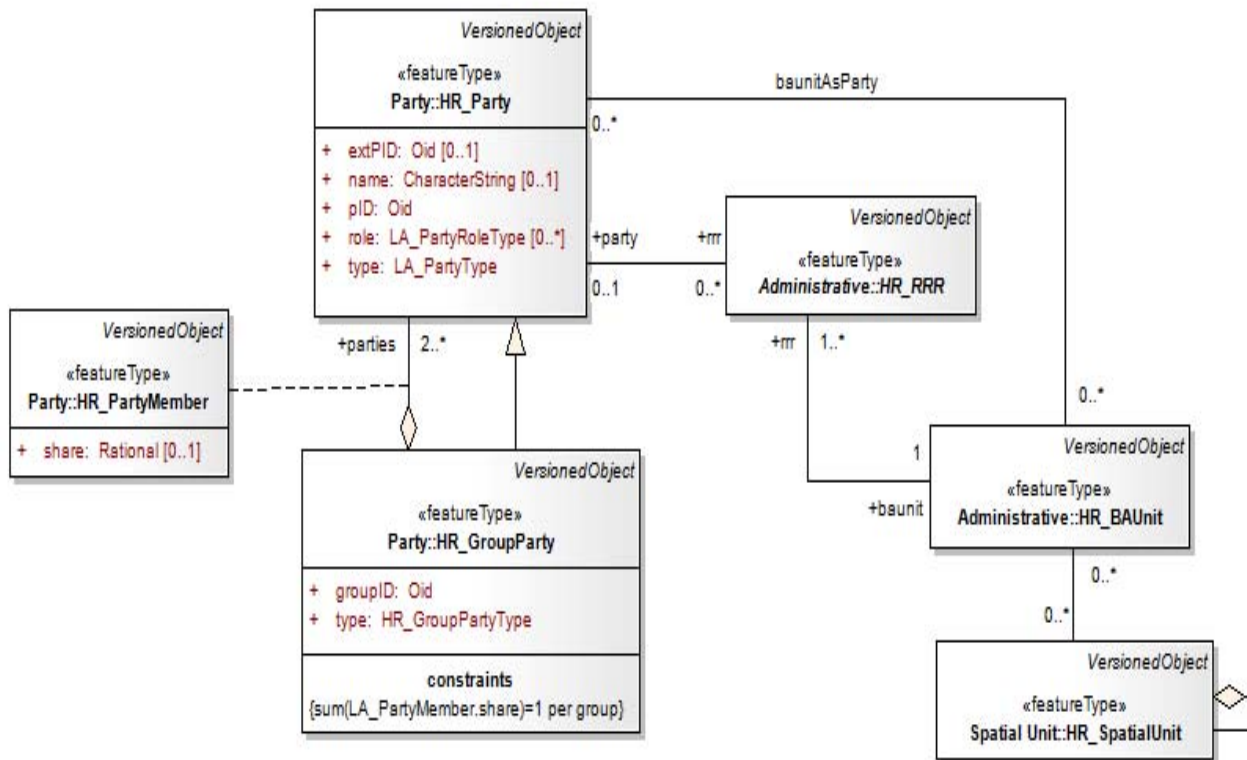
«codeList» HR_UsageType_Land
+ unclassifiedAgriculturalLand = 1
+ plowfield = 2
+ plowfield-greenhouse = 3
+ garden = 4
+ garden-greenhouse = 5
+ garden_polytheneGreenhouse = 6
+ orchard = 7
+ orchard-nursery = 8
+ oliveGrove = 9
+ oliveGrove-nursery = 10
+ vineyard = 11
+ vineyard-nursery = 12
+ grazingLand = 13
+ reed-patch = 14
+ fish-pond = 15
+ forests = 16
+ otherWoodlands = 17
+ river = 18
+ stream = 19
+ canal = 20
+ lake = 21
+ reservoir = 22
+ pool = 23
+ backwater = 24
+ pond = 25
+ swamp = 26
+ sea = 27
+ fish-farm = 28
+ mariculture = 29
+ unfertileLand = 30
+ cliffs = 31
+ rockyGround = 32
+ bareRockyGround = 33
+ dryStoneWall = 34
+ sand = 35
+ land-slideSite = 36
+ gully = 37
+ sandbank = 38
+ rockyCoastline = 39
+ gravelCoastline = 40
+ constructedLand = 42
+ landUnderBuilding = 43
+ yard = 44
+ park = 45
+ landForSportAndRecreation = 46
+ children'sPlayground = 47
+ market = 48
+ fairgrounds = 49
+ cemetery = 50
+ developedBeach = 51
+ port = 52
+ marina = 53
+ airport = 54
+ stoneQuarry = 55
+ gravelPit = 56
+ sandPit = 57
+ opencast = 58
+ embankment = 59
+ slash = 60
+ dike = 61
+ waste = 62
+ disposlaSite = 63
+ street = 64
+ square = 65
+ road = 66
+ path = 67
+ highway = 68
+ railwayLine = 69

Country profile Croatia (code lists)

Party package

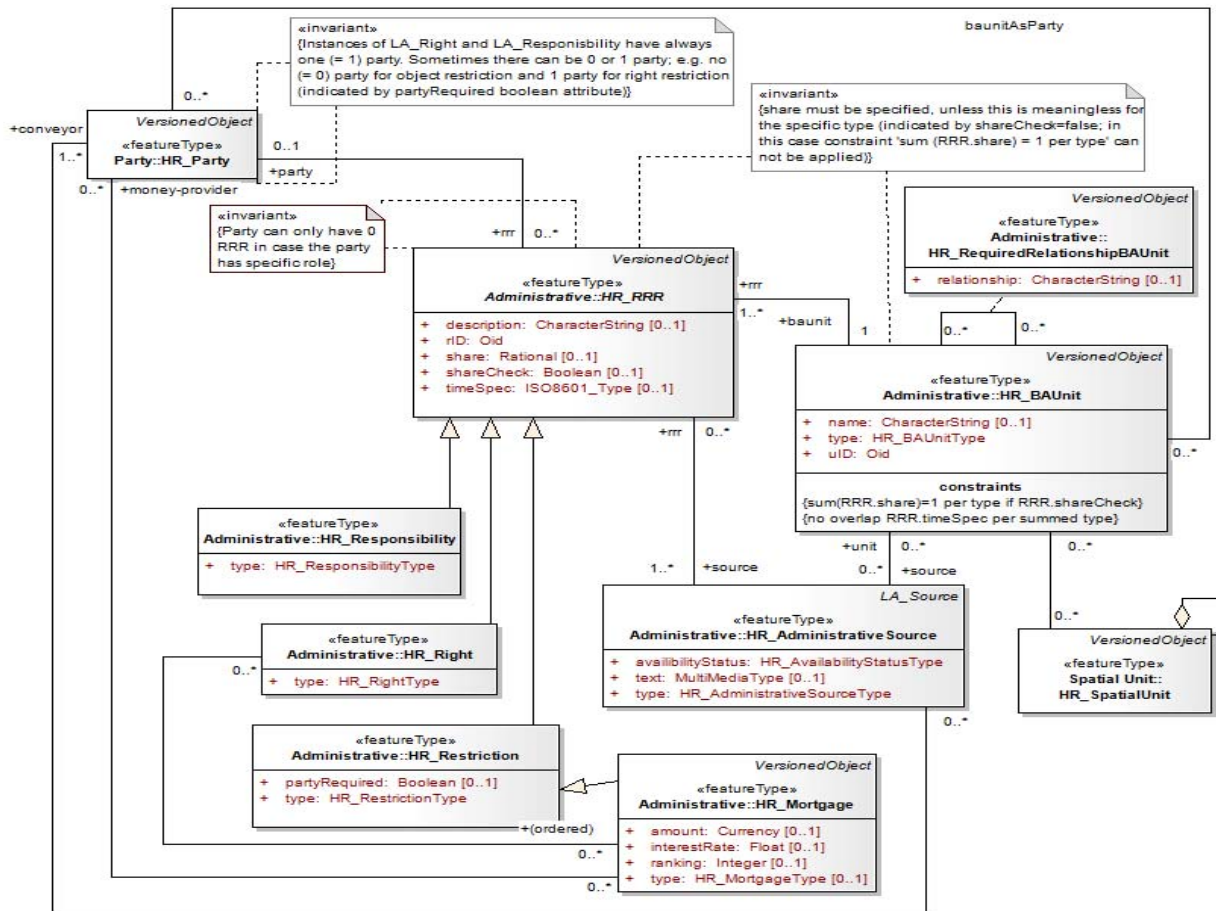
- The main class of the party package is class LA_Party with its specialization LA_GroupParty.
- A party is a person or organization that plays a role in rights transaction. An organization can be a company, a municipality, the state or church community (in Croatia - usually legal persons). A “group party” is any number parties, forming together a distinct entity (in Croatia - usually ex. “land communities”).
- Classes LA_Party with its specialization LA_GroupParty can be applied directly to the Croatian Land Administration System. The types in the code lists have been changed and added to suit to the Croatian LAS.

Party package



Administrative package

- The attributes and relationships in the administrative package of Country profile Croatia are similar to LADM and all classes of Administrative package can be applied directly to the Croatian Land Administration System.
- The types in the code lists have been changed and added to suit to the Croatian LAS



Administrative package



Spatial unit package

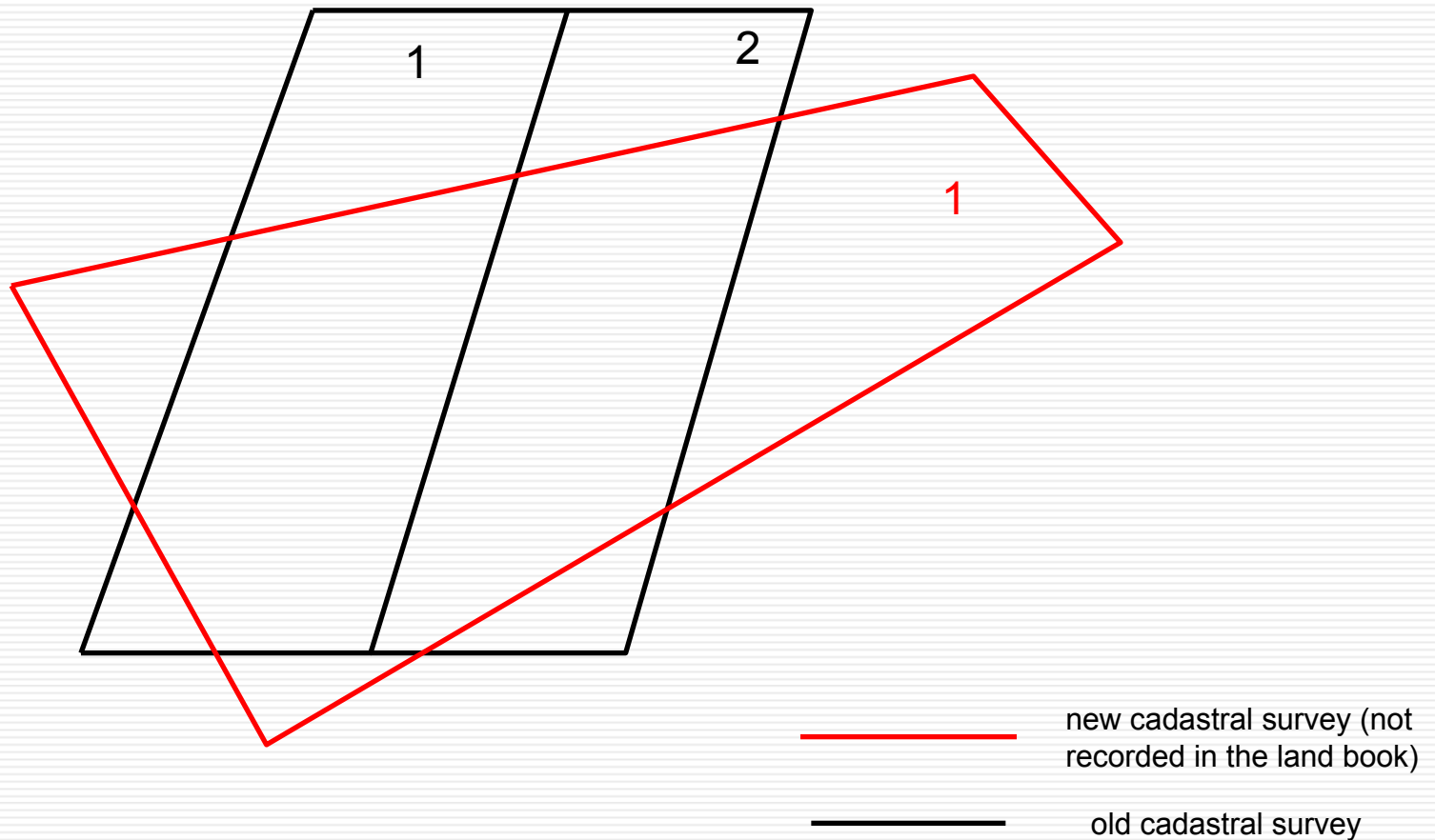
- The spatial unit package presents the attributes of the land parcels, buildings and other properties associated with land
- Some attributes related to the cadastral parcel should be added: area, duration of land use, land use type, legality of the building.
- Two **new** classes called HR_OldCadastralSurvey and HR_LegalityOfTheBuilding

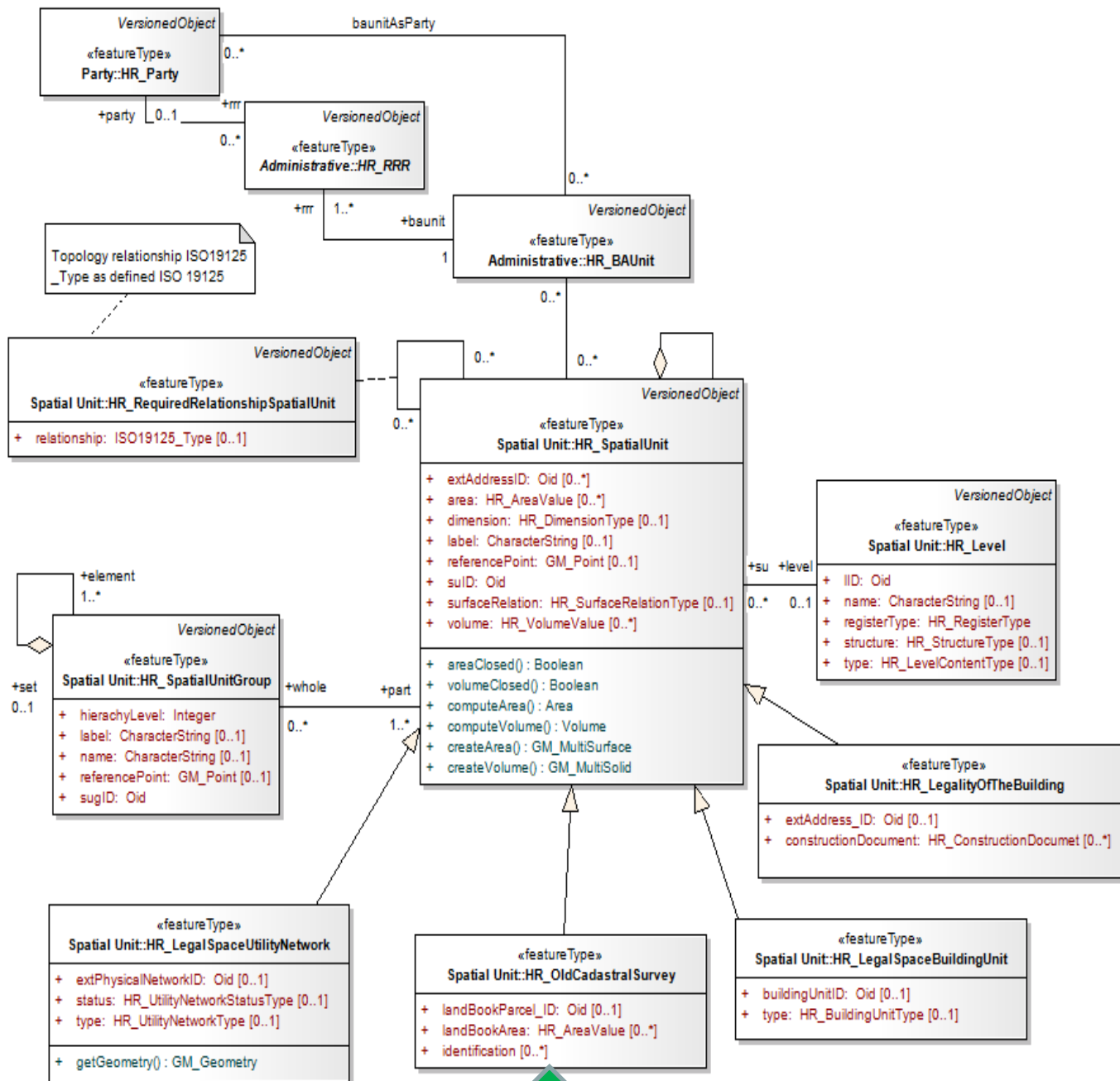
HR_LegalityOfTheBuilding



source: <http://www.jutarnji.hr/na-jesen-ce-se-rusiti-bespravna-gradnja--i-to-najvise-na-obali/1045411/>

HR_OldCadastralSurvey





Spatial unit package



«codeList» SpatialUnit:HR_UtilityNetworkType
<ul style="list-style-type: none"> + chemicals + electricity + gas + oil + telecommunication + water + sewerageSystem

«codeList» SpatialUnit:HR_StructureType
<ul style="list-style-type: none"> + point + polygon + text + topological + unstructuredLine + sketch

«codeList» SpatialUnit:HR_VolumeType
<ul style="list-style-type: none"> + calculatedVolume + surveyedVolume + surveyedArea

«dataType» SpatialUnit:HR_AreaValue
<ul style="list-style-type: none"> + areaSize: Area + type: HR_AreaType

Spatial unit package (code lists)

«codeList» SpatialUnit:HR_UtilityNetwork Status Type
<ul style="list-style-type: none"> + inUse + outOfUse + planned

«codeList» SpatialUnit:HR_AreaType
<ul style="list-style-type: none"> + calculatedArea + officialArea + surveyedArea

«enumeration» SpatialUnit:HR_BuildingUnitType
Attributes
<ul style="list-style-type: none"> + shared + individual

«codeList» SpatialUnit:HR_RegisterType
<ul style="list-style-type: none"> + urban + rural + publicSpace + forest

«codeList» SpatialUnit:HR_LevelContentType
<ul style="list-style-type: none"> + building + customary + informal + mixed + network + primaryRight + responsibility + restriction

«codeList» SpatialUnit:HR_ConstructionDocument
<ul style="list-style-type: none"> + olderThan15thFebruary1968 + buildingPermitsAndBuildingInspectionCertificate + occupancyPermit + DecisionOnTheConstructionStatus

«codeList» SpatialUnit:HR_DimensionType
<ul style="list-style-type: none"> + 0D + 1D + 2D + 3D + liminal

Conformance testing

- The abstract test suite is in conformance with ISO 19105. The test suite in Annex A of the LADM specifies the requirements that the implementation under test has to meet in order to be conformant to this International Standard. For each test the metadata conformity element takes one of the following values:
- *Conformant (conformant). The resource is fully conformant with the cited specification*
- *Not Conformant (notConformant). The resource does not conform to the cited specification*
- *Not evaluated (notEvaluated). Conformance has not been evaluated.*

CONCLUSION

- In conclusion, the adoption of LADM in the Republic of Croatia is possible.
- Most of LADM classes can apply directly to Croatian Land Administration System (LAS).
- The types in some code lists have been changed and added to suit to the Croatian LAS.
- This research proposes two new classes called HR_OldCadastralSurvey and HR_LegalityOfTheBuilding which are solving specifics of the Croatian LAS.

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The screenshot shows the Geoportal DGU web application. The browser window title is "Preglednik | Geoportal DGU - Mozilla Firefox". The address bar shows "geoportal.dgu.hr/viewer/?baselayer=DOF". The page header includes the "GEOPORTAL" logo and navigation links: "NASLOVNA", "PODACI I SERVISI", "PREGLEDNIK", "UPUTE", and "KONTAKT". The main interface features a left sidebar with a legend titled "Sadržaj" and "Pregledna karta". The legend includes categories like "Središnji registar prostornih jedinica" (with sub-items: Županije, Gradovi i općine, Naselja, Mjesna samouprava) and "Digitalni katastarski plan" (with sub-items: Područni uredi za katastar/ispostave, Katastarske općine, Čestice, Zgrade, Kućni broj, Nazivi). The main map area shows an aerial view of a city street intersection with a scale of 1:2000. A scale bar indicates 50m and 100ft. The coordinates are displayed as "Koordinate (HTRS96): E = 460507.8, N = 5073032.2 | φ = 45.796023, λ = 15.991994". The footer contains the logos of the "REPUBLIKA HRVATSKA DRŽAVNA GEODETSKA UPRAVA" and "DGU", along with the text "Optimizirano za: Firefox, Chrome, Opera, Safari, IE7+" and "©2012 Državna geodetska uprava. Sva prava pridržana. Ujeti korištenja".

Thank
you
for
your
attention!