



# Lessons learned from the creation of the LADM based country profiles

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# LADM based country profiles

- **Creation:**

- Is documentation of the existing cadastral data model available (known) to public or academia?
- Should anybody from the national mapping agency be involved in the process of the creation of the profile?
- In which way the LADM based profile (for given country) was created?
- Does LADM based profile describe the current or future situation?

- **Dissemination:**

- How has the LADM based country profile been promoted to the bodies responsible for the cadastral system development?
- Has the LADM based country profile already been applied in the production environment in given country or is going to be applied in the near future, e.g. in the next five years?

# Approach

- The four national case studies (Croatia, Czech Republic, Poland and Serbia) were explored in detail.
- These four national case studies were selected due to the similar history and geographical location of given countries.
- The authors of the selected LADM based country profiles were personally involved in this research and contributed with their experience.
- Based on the shared common experience the conclusions regarding the development of LADM based country profiles and their further application are given.

# LADM 2018 workshop, Zagreb

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- **TOPIC:** LADM experiences
- **TITLE:** LADM – experiences and challenges in implementation
- **AUTHORS:** Miro Govedarica, Aleksandra Radulović, Dubravka Sladić, and Dragana Popović

# Motivation/Problem/Goal

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- **Motivation** for this research is to show experiences and challenges in development of LADM based profiles for Serbia, Montenegro and Republika Srpska (an entity in Bosnia and Herzegovina) as well as in implementation of technical solution for Land Information Systems (LIS) in these regions.
- **Problem** : Improvement of Land Information Systems due to many organizational and operational problems
- **Goal** of this research is to develop standardized data model for cadastre in these regions as a basis for improved LIS and to show similarities and differences among three systems

# Approach/Solution/Results

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- **Approach: Steps in research:**
  - analysis of appropriate national law and other relevant documents
  - analysis of the international standards and literature review
  - analysis of the current land information system (LIS) in specific region
  - conceptual modeling
  - development of standardized domain model
  - development of technical solution which covers maintaining cadastral data, maintaining office management data, search and overview of cadastral data through web – eCadastre, customized GIS tool, Geoportal, cadastral web services
  - analysis of technologies and formats for introducing 3D data in cadastre
- **Solution: conceptual data modeling and development of standard based LIS, LADM experiences**
- **Results: LADM profiles and new technical solution**

# Analysis of Studies on the Land Administration Domain Model in Turkey

**Mehmet ALKAN and  
Zeynel Abidin POLAT**

*Department of Geomatics  
Yıldız Technical University,  
İSTANBUL/TURKEY*



# Overview

- **Motivation**

**LADM Application in country profiles  
(Turkey)**

- **Problems**

**Determine LADM studies for Turkey**

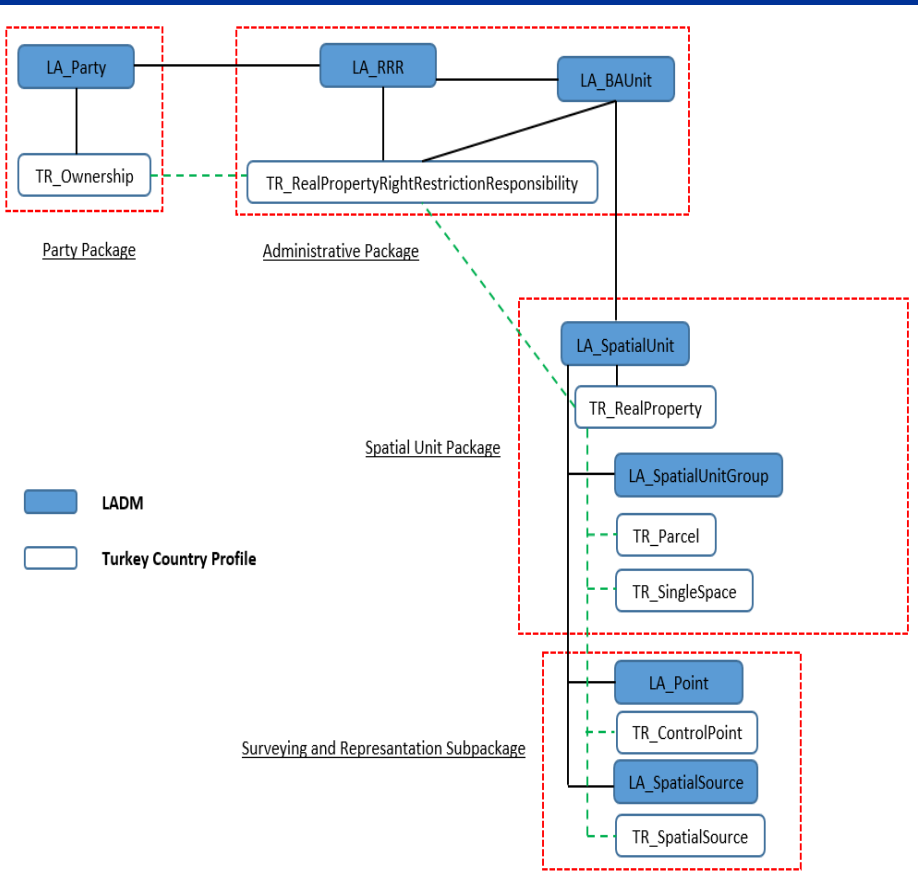
- **Goals**

**Design and Determine LADM for Turkey**



# Approach / Solutions / Results

- Studies on the LADM in Turkey (Approach)
- Figure : Turkey's land administration profile and corresponding LADM classes (Solution)



- In this paper, the application of LADM was discussed with a focus on the academic and institutional studies in Turkey. The results of the study indicate that effective functioning of the information infrastructure LADM-based requires proper integration of data, proceeded by analysing the contents of existing data sets, indicating key registers and defining a linkage system between them.
- LADM presents the general conceptual schemas for land administration. And also, this model provides the basis for national and regional profiles and enables the combination of land management information from different sources in a coherent manner. For this reason, there are several countries that apply LADM to establish a country profile for their land administration system. **(RESULTS)**



## Fast forward presentation Paper 15

### International code list management - The case of Land Administration

Erik Stubkjær, Jesper M. Paasch, Volkan Çağdaş, Peter van Oosterom,  
Scott Simmons, Jenny Paulsson and Christiaan Lemmen



**UNIVERSITY OF TWENTE.**

7<sup>th</sup> International FIG workshop on the Land Administration Domain Model  
12-13 April 2018, Zagreb, Croatia

«codeList» Administrative:: LA_RightType
+ agriActivity
+ commonOwnership
+ customaryType
+ fireWood
+ fishing
+ grazing
+ informalOccupation
+ lease
+ occupation
+ ownership
+ ownershipAssumed
+ superficies
+ tenancy
+ usufruct
+ waterRights

ISO

*Cadastre and Land Administration Thesaurus (CaLAtHe)*

**Goal**

**Illustrate the situation with existing code lists for land management**

**Highlight the need for joint cooperation between stakeholders producing and using code lists**

«codeList» Surveying and Representation:: LA_SpatialSourceType
+ fieldSketch
+ gnssSurvey
+ orthoPhoto
+ relativeMeasurement
+ topoMap
+ video

«codeList» Administrative:: LA_AvailabilityStatusType
+ archiveConverted
+ archiveDestroyed
+ archiveIncomplete
+ archiveUnknown
+ docAvailable

*Inspire*

«codeList» Surveying and Representation:: LA_MonumentationType
+ beacon
+ cornerstone
+ marker
+ notMarked

*Open Geospatial consortium*

«codeList» Administrative:: LA_AdministrativeSourceType
+ agriConsent
+ agriLease
+ agriNotaryStatement
+ deed
+ mortgage
+ title

## ***Result***

**We suggest cooperation between ISO, OGC (Open Geospatial Consortium) and others**

**A draft Memorandum of Understanding can be found in appendix 1**





# Deriving the technical model for the indoor navigation prototype based on the integration of IndoorGML and LADM Conceptual Model

Abdullah Alattas, Peter van Oosterom, and Sisi Zlatanova

**Motivation:** Is to convert the LADM-IndoorGML conceptual model to technical model to realize applications needing the users access right in various type of indoor environments

### Problems:

- Incomplete conceptual model IndoorGML (UML class diagram)
- Converting current <<codeList>> structure of the code list in LADM standard
- The Enterprise Architect software does not provide fully automated transformation model for: Primary keys (and Foreign keys), Association multiplicity, Attributes multiplicity, Code list, (Spatial) Data types, (Spatial) Indexing/ Clustering, Constraints, Inheritance,...

**Goal:** The aim of the research is assessing the conceptual model

**Approach:** There are three steps to convert the conceptual model:

1. **Prepare** the LADM-IndoorGML UML model
2. **Transform** the class diagram to table diagram
3. **Generate** SQL DDL code from the table diagram

**Solution:** During each of the step to convert the conceptual model into technical model, there are two types of solution (manual or automated), and based on the type of issue and the software, we decide what solution is used (for now)

**Main results:**

- The conversion of conceptual model to technical model is not straightforward, it interspersed with several issues that make it complicated
- A growing understanding of all aspects relevant in transformation of technical model (as basis for more fully automated conversion in future)


# Case study of the Colombian ISO 19152:2012 profile

## Legal independence, modularity and implementation of LADM using INTERLIS

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Proyecto  
Modernización de la  
Administración de Tierras  
en Colombia

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Confederazione Svizzera  
Confederaziun svizra

Embajada de Suiza en Colombia  
Cooperación Económica y Desarrollo (SECO)





## Colombian Challenges

### COMPLEX INSTITUTIONAL SETTING

many institutions with responsibilities about land issues and Data

### LEGAL INDEPENDENCE

The current legal framework requires legal independence: each theme of land administration must be managed separately from another

### INCOMPLETE INFORMATION

The official information does not shows the complete situation of land right and restrictions. (Cadaster 2014)

### NO DATA INTEROPERABILITY

Missing standards and inconsistent data. The institutions do not want to exchange land information



## MODULARITY

Core module and extended modules for each topic of land administration.  
Each institution its responsible for its own model

## LADM\_COL

Semantic interoperability through Colombian ISO 19152 profile. It includes informal rights and describes different types of restrictions



## INTERLIS MODEL DESCRIPTION

Supports system independent implementation (MDA), data Exchange and automated validation.

# Full presentation – Fri, Apr 13 - 9:00 AM

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<https://www.proadmintierra.info/>

<https://github.com/AgenciaImplementacion>

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Confederaziun svizra

Embajada de Suiza en Colombia  
Cooperación Económica y Desarrollo (SECO)



# The LADM Valuation Information Model based on INTERLIS

**Abdullah Kara, Yıldız Technical University, Turkey**

Volkan Çağdaş, Yıldız Technical University, Turkey

Ümit Işıkdağ, Mimar Sinan Fine Arts University, Turkey

Peter van Oosterom, Delft University of Technology, The Netherlands

Christiaan Lemmen, University of Twente, The Netherlands

Erik Stubkjær, Aalborg University, Denmark

**7th International FIG workshop on the Land Administration Domain Model, 12-13 April 2018, Zagreb, Croatia**

# Motivation – Problem – Goal

## Motivation

Investigating the use of INTERLIS tools for the technical implementation of the LADM Valuation Information Model and its Turkish Country Profile.

## Problem

Automated the transformation of a conceptual model into a physical database (e.g. PostgreSQL and Oracle Spatial 11g) in terms of classes, code lists, constraints of the LADM Valuation Information Model

## Goal

Defining of the classes, code lists and constraints of the LADM Valuation Information Model and its Turkish Country Profile in INTERLIS Conceptual Schema Language and converting them in Oracle 11g database schema.

# Approach – Solution - Results

## Approach

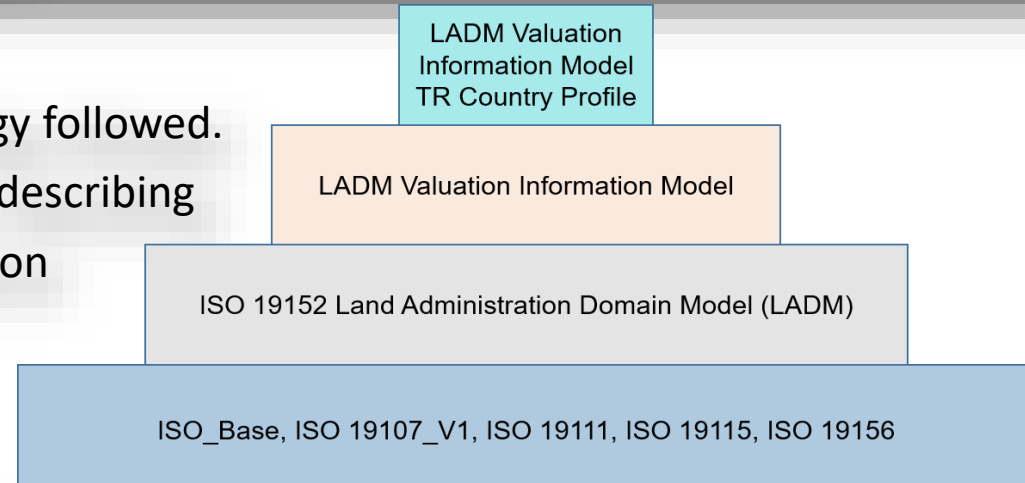
Figure on the right shows the methodology followed. All the predefined INTERLIS files used for describing and converting LADM Valuation Information Model.

## Solution

The corresponding physical schemas (Oracle 11g) were automatically derived based on the INTERLIS conceptual schema definitions of the LADM Valuation Information Model and its Turkish Country Profile.

## Results

- There are some strengths and limitations of the INTERLIS tools for automatic transformation from conceptual to technical model.
- LADM Valuation Information Model described in INTERLIS, therefore, it can be used for further implementations.





The 7th Land Administration Domain Model Workshop  
Zagreb, Croatia, 11-13 April 2018.

# Is LADM ready for maritime domain? – Case study Croatia

Veljko Flego, dipl. ing.  
dr. sc. Miodrag Roić  
Irena Benasić, dipl. ing.

# Maritime domain registration is...

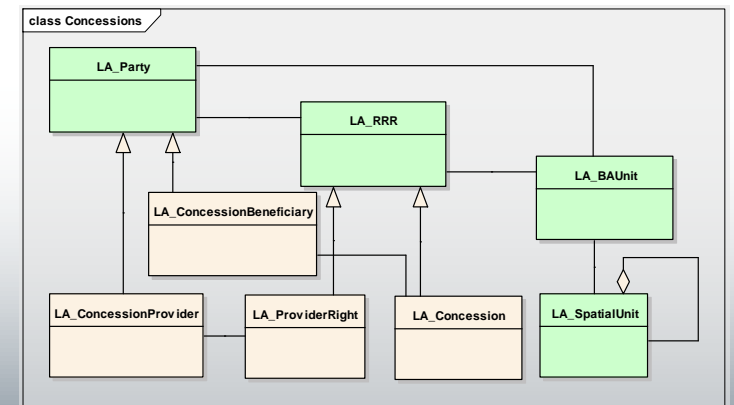
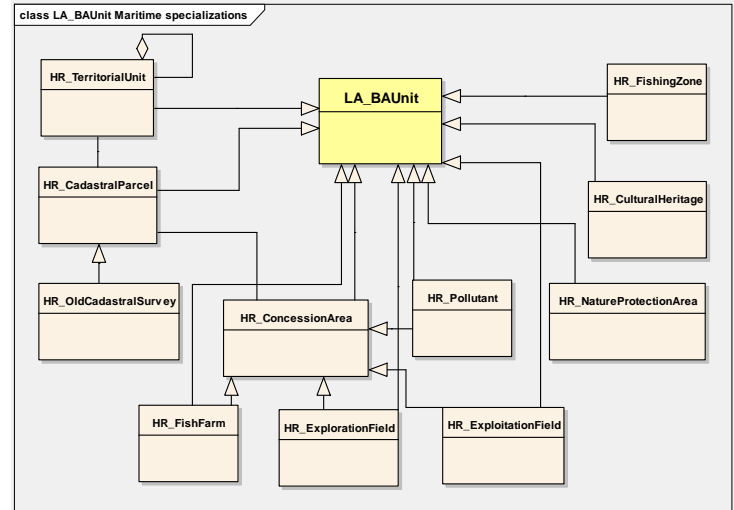
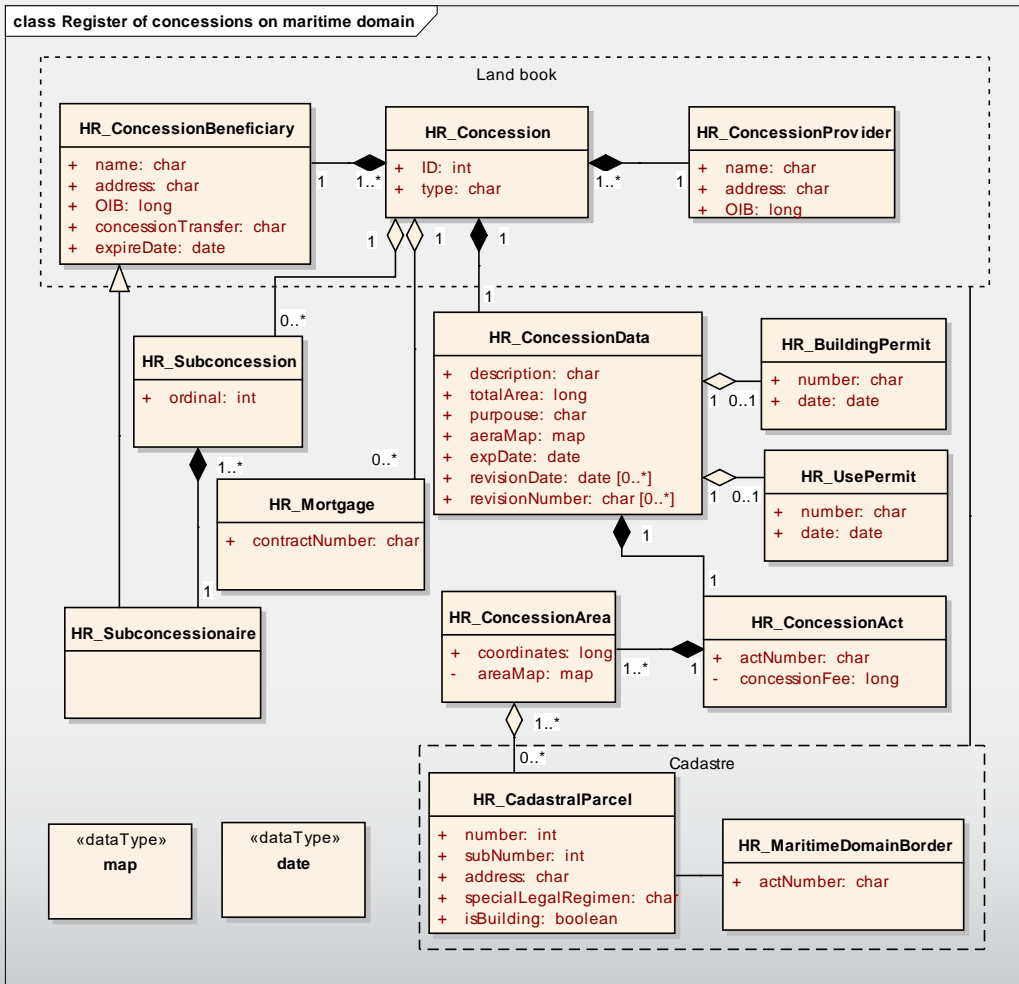
- Carried out in several key registers
  - In different institutions
  - In different levels
  - Mostly just extended from onshore to offshore area
- Complex
- Not standardized
  - Which obstructs interoperability and usability of registers





# To improve the interoperability...

- Can LADM be used as a model?
- Registers were modeled using UML
- Models compared to LADM
  - Structure level schema matching
  - Basic LADM classes identified
- LADM is suitable and can be extended to maritime domain



# **EXTENSIONS TO THE LADM TRINIDAD AND TOBAGO TOWARD A JURIDICAL, FISCAL, AND MARINE CADASTRE**

**Charisse GRIFFITH-CHARLES, Michael SUTHERLAND, and Sunil LALLOO**

**Trinidad and Tobago**

LADM2018: The 7th Land Administration Domain Model Workshop

Hotel Antunovic

Zagreb, Croatia, April 12-13, 2018



**AREA**  
**5,131 km<sup>2</sup>**

**POPULATION**  
**1.3 million**

## **PROBLEMS**

- **FORMAL CADASTRE SEPARATED**
- **FORMAL CADASTRE = ½ TOTAL PARCELS**
- **LADM STILL NOT IMPLEMENTED**



## AREA

5,131 km<sup>2</sup>

## POPULATION

1.3 million

## APPROACH

- PRELIMINARY ASSESSMENT OF POTENTIAL IMPACT OF NEW LEGISLATION AND INITIATIVES ON FURTHER DEVELOPMENT OF LADM MODEL