# The Road to a Standard for the Land Administration Domain and beyond…

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# International Organization for Standardization (ISO)

- A publisher of International Standards
- A network of the national standards institutes of 161 countries
- ISO's standards range from agriculture and construction, to ICT, and to standards for services
- Standards are developed by Technical Committees (TC's)

## International Organization for Standardization (ISO)

| ... | ... |
|---|---|
| **TC 202** | **Microbeam analysis** |
| **TC 203** | **Technical energy systems** |
| **TC 204** | **Intelligent transport systems** |
| **TC 205** | **Building environment design** |
| **TC 206** | **Fine ceramics** |
| **TC 207** | **Environmental management** |
| **TC 208** | **Thermal turbines for industrial** |
| **TC 209** | **Cleanrooms and associated controlled environments** |
| **TC 210** | **Quality management and for medical devices** |
| **TC 211** | **Geographic information/Geomatics** |
| **TC 212** | **Clinical laboratory testing and in vitro diagnostic test systems** |
| **TC 213** | **Dimensional and geometrical product specifications and verification** |
| **TC 214** | **Elevating work platforms** |
| **TC 215** | **Health informatics** |
| ... | ... |

**FIG**

## ISO/TC 211 - 32 countries

| | | |
|---|---|---|
| Australia | Hungary | Russian Federation |
| Austria | Italy | Saudi Arabia |
| Belgium | Japan | Serbia |
| Canada | Republic of Korea | South Africa |
| China | Malaysia | Spain |
| Czech Republic | Morocco | Sweden |
| Denmark | Netherlands | Switzerland |
| Ecuador | New Zealand | Thailand |
| Finland | *Norway* | United Kingdom |
| France | Peru | United States of America |
| Germany | Portugal | |

**FIG**

# ISO/TC 211
## List of standards (partial)

- ...
- **ISO/TR 19121:2000 – Imagery and gridded data**
- **ISO/TR 19122:2004 – Qualification and certification of personnel**
- **ISO 19123:2005 – Schema for coverage geometry and functions**
- **ISO 19125-1:2004 – Simple feature access – Part 1: Common architecture**
- **ISO 19125-2:2004 – Simple feature access – Part 2: SQL Option**
- **ISO/TS 19127:2005 – Geodetic codes and parameters**
- **ISO 19128:2005 – Web Map Server Interface**
- **ISO/TS 19129:2009 – Imagery, gridded and coverage data framework**
- **ISO 19131:2007 – Data product specification**
- **ISO 19132:2007 – Location-based services – Reference model**
- **ISO 19133:2005 – Location-based services – Tracking and navigation**
- **ISO 19134:2007 – Location-based services – Multimodal routing and navigation**
- **ISO 19135:2005 – Procedures for item registration**
- **ISO 19136:2007 – Geography Markup Language (GML)**
- **ISO 19137:2007 – Core profile of the spatial schema**
- **ISO/TS 19138:2006 – Data quality measures** (under revision)
- **ISO/TS 19139:2007 – Metadata – Implementation specification**
- ...

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# LADM History

- 2002-2008
  - Many articles and conference papers
- 2008
  - FIG submits LADM as a proposal to ISO/TC 211
- 2008-2010
  - Reviews, working drafts, committee drafts, etc.
- Status now
  - Draft International Standard (DIS)
  - 2012: International Standard?

# Objectives and Basic Components

- Two *objectives*
    1. (UML-)model for building Land Administration systems
    2. Basis for communication (a Land Administration terminology)
- Five *basic components*
    1. Persons and organizations ('*Parties*')
    2. Rights, restrictions and responsibilities ('*RRR*')
    3. Parcels, buildings and construction works ('*Spatial Units*')
    4. Surveying
    5. Geometry and Mapping
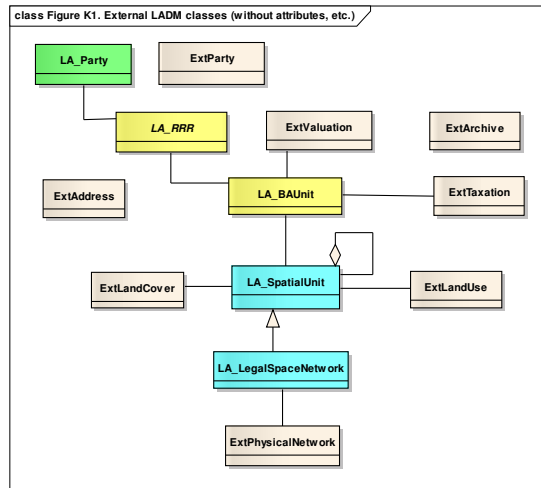
# UML Diagram

Components
- Persons (green)
- Rights (yellow)
- Parcels (blue)
- Surveying (pink)
- Mapping (violet)
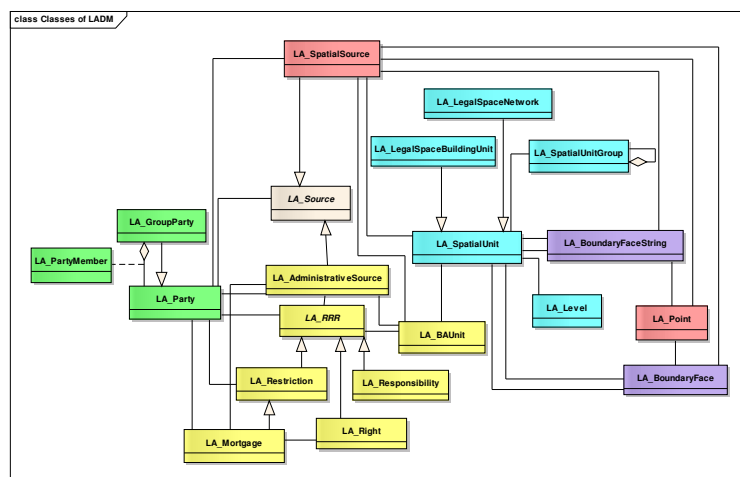
# External Links

External links
- Addresses
- Persons
- Valuation
- Taxation
- Land cover
- Land use
- Documents
- Utility networks

**class Figure K1. External LADM classes (without attributes, etc.)**



LA_Party · ExtParty · LA_RRR · ExtValuation · ExtArchive · ExtAddress · LA_BAUnit · ExtTaxation · ExtLandCover · LA_SpatialUnit · ExtLandUse · LA_LegalSpaceNetwork · ExtPhysicalNetwork
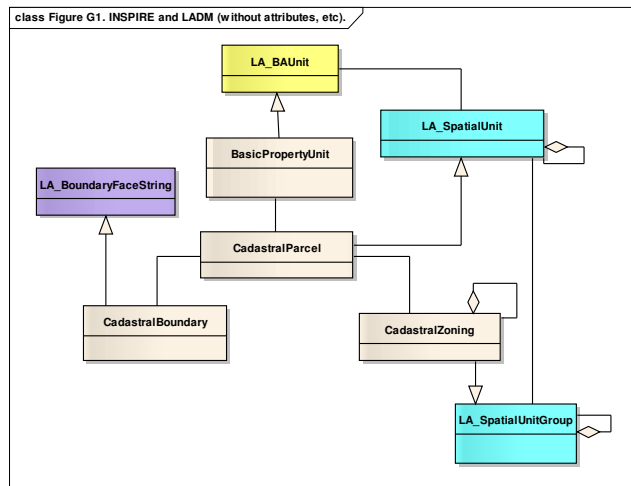
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# Implementation and use in practice

- Country profiles
- Land Parcel Information System
- INSPIRE
- Social Tenure Domain Model
- FAO Solutions for Open Land Administration

# Country profile NL



# Land Parcel Information System

- Integration of LADM with the Land Parcel Information System of the European Commission for subsidies to farmers

# INSPIRE Cadastral parcels

- INSPIRE
  cadastral
  parcels
  data set is
  consistent
  with LADM



**class Figure G1. INSPIRE and LADM (without attributes, etc).**

LA_BAUnit
LA_SpatialUnit
BasicPropertyUnit
LA_BoundaryFaceString
CadastralParcel
CadastralBoundary
CadastralZoning
LA_SpatialUnitGroup

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# Social Tenure Domain Model

- Social Tenure Domain Model STDM is a specialization of LADM
- Software prototype
- Built with 'Open Source' software
- Initiative of UN-HABITAT to support pro-poor land administration
- Motivation: urgent need for registration of tenure relationships
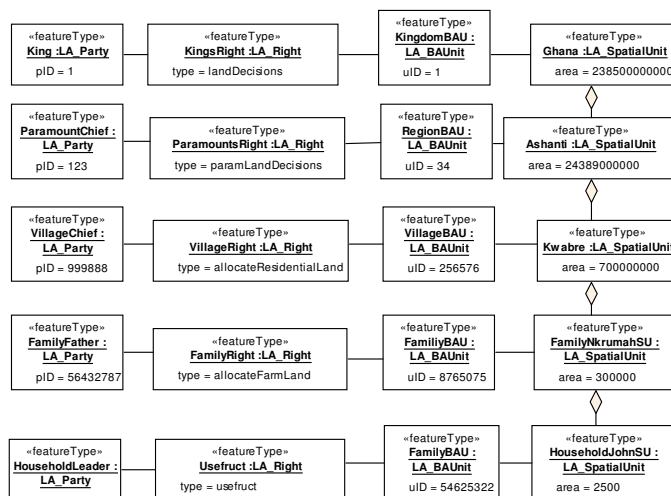
Social Tenure Domain Model

- World Bank/UN-HABITAT field test Ethiopia (2009)
- Very high understanding of images
- Very participatory approach



STDM Customary Rights – Example Ghana

| «featureType» **King :LA_Party** pID = 1 | «featureType» **KingsRight :LA_Right** type = landDecisions | «featureType» **KingdomBAU : LA_BAUnit** uID = 1 | «featureType» **Ghana :LA_SpatialUnit** area = 238500000000 |
| «featureType» **ParamountChief : LA_Party** pID = 123 | «featureType» **ParamountsRight :LA_Right** type = paramLandDecisions | «featureType» **RegionBAU : LA_BAUnit** uID = 34 | «featureType» **Ashanti :LA_SpatialUnit** area = 24389000000 |
| «featureType» **VillageChief : LA_Party** pID = 999888 | «featureType» **VillageRight :LA_Right** type = allocateResidentialLand | «featureType» **VillageBAU : LA_BAUnit** uID = 256576 | «featureType» **Kwabre :LA_SpatialUnit** area = 700000000 |
| «featureType» **FamilyFather : LA_Party** pID = 56432787 | «featureType» **FamilyRight :LA_Right** type = allocateFarmLand | «featureType» **FamiliyBAU : LA_BAUnit** uID = 8765075 | «featureType» **FamilyNkrumahSU : LA_SpatialUnit** area = 300000 |
| «featureType» **HouseholdLeader : LA_Party** | «featureType» **Usefruct :LA_Right** type = usefruct | «featureType» **FamilyBAU : LA_BAUnit** uID = 54625322 | «featureType» **HouseholdJohnSU : LA_SpatialUnit** area = 2500 |

## Beyond LADM

- More domain standards
  - » Domain sources maintained in a consistent manner.
- Transparency of Land Administration processes
  - » 'Best practices' and harmonization.
- 3D (space) & 4D (time) registration
  - » 4D integrated space/time paradigm.
- From 'registration system' into 'design system'
  - » Design of new spatial units in land management.
- A whole range of new registrations
  - » New 'people – spatial phenomena' relationships.

## Beyond LADM

- Mobile applications
  - Augmented reality, with precise positioning.
- Monitoring applications
  - Decision making in water and food provision.
- International seamless registration
  - An international coverage that 'fits'.
- Semantic web-based content
  - All information in an unambiguous manner.
- Faster and direct updating by actors
  - Up-to-date and precise reference data.

# Conclusions

- LADM is at DIS stage
- LADM strengthens the relationship between Cadastre and other public registers (INSPIRE, etc.)
- STDM enables the massive registration of tenure relationships and customary rights
- Standardization of other Domains

**FIG**

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# Thank you

**FIG**