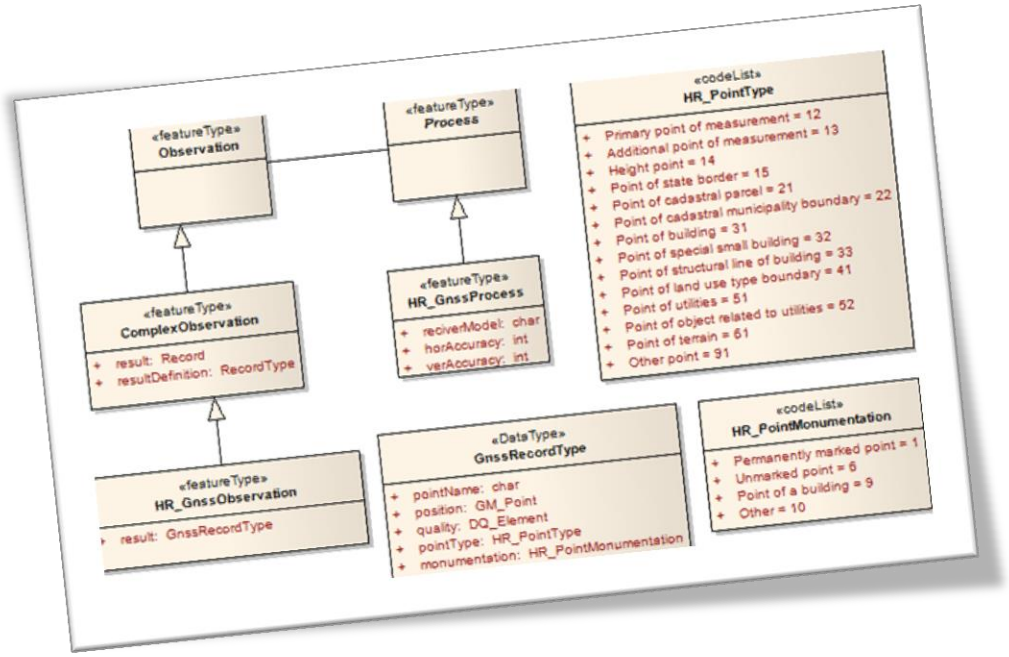

Development of a Model For Land Survey Data based on ISO 19156

V. Cetl, S. Vranić, H. Matijević

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8th YEAR OF PhD STUDENT SCIENTIFIC CONFERENCE
TECHNICAL UNIVERSITY IN ZVOLEN

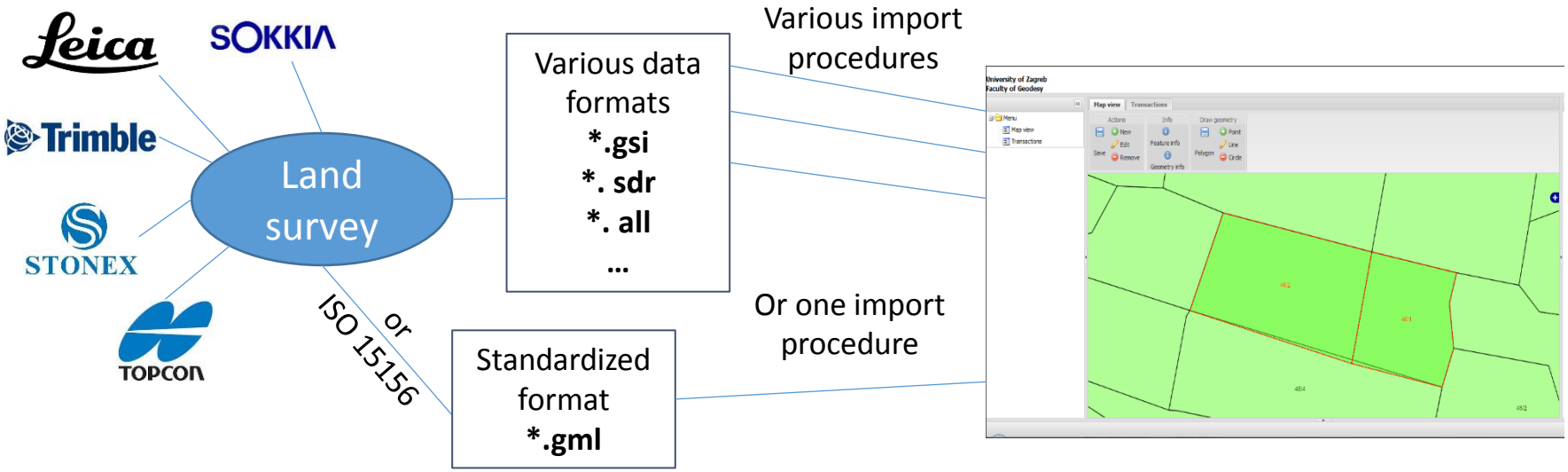
Geodetski fakultet Sveučilišta u Zagrebu
Institute of applied geodesy, Chair for land surveying
Kačićeva 26; HR-10000 Zagreb, CROATIA
Web: www.geof.unizg.hr; Tel.: (+385 1) 46 39 210

Introduction

- Standardization of data management
  - ISO, CEN, HZN
  - OGC
- Possible uses of land survey data:
  - More efficient preparation for future measurements
  - Faster data processing
  - Easier data exchange between different parties
  - Easier land disputes resolving

Motivation

- Variety of survey instruments and data formats



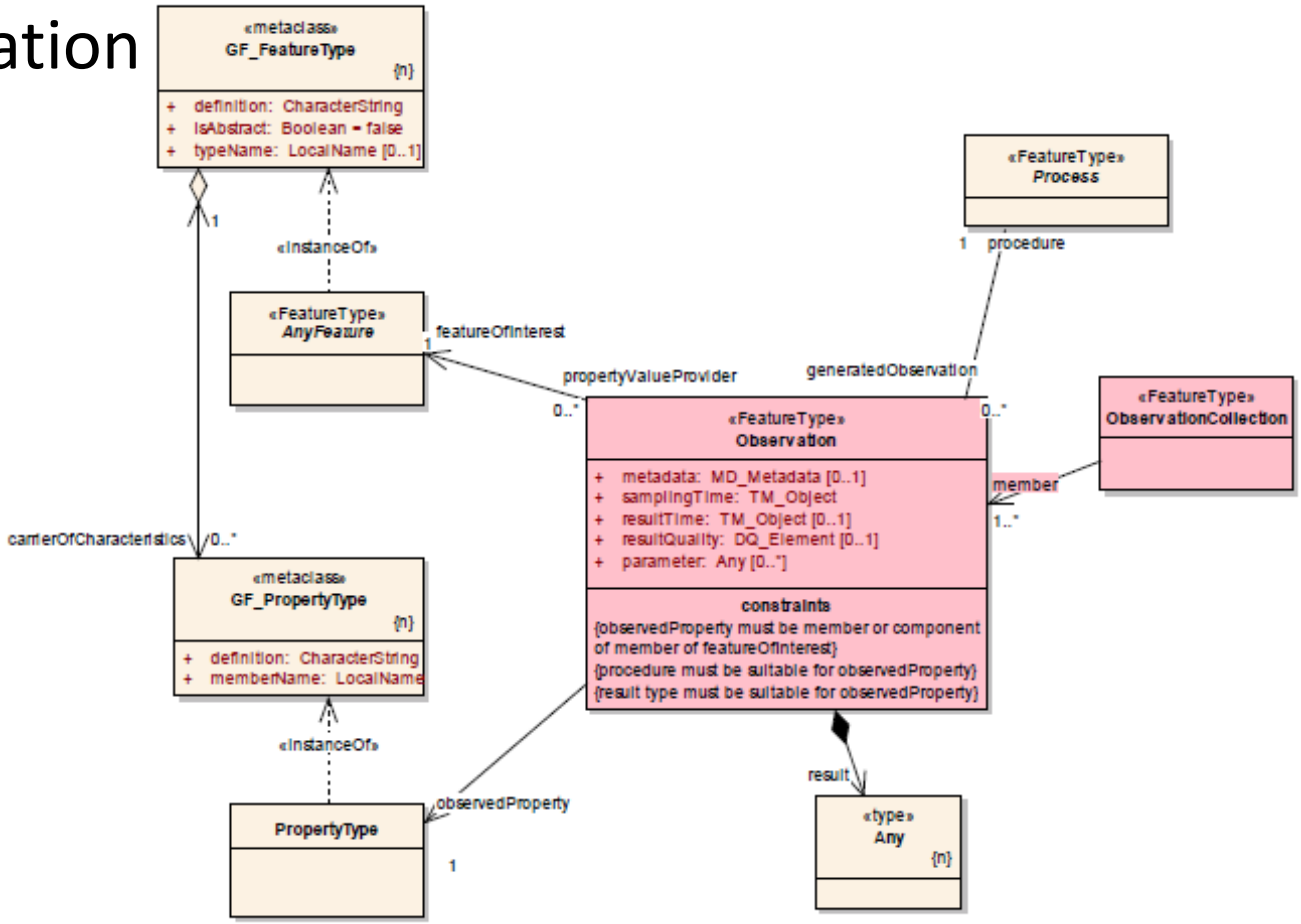
- Standardized model
  - Object oriented (extendable, configurable, …)
  - Implementation (**GML**, LandXML)

ISO 19156 – Observation and measurement

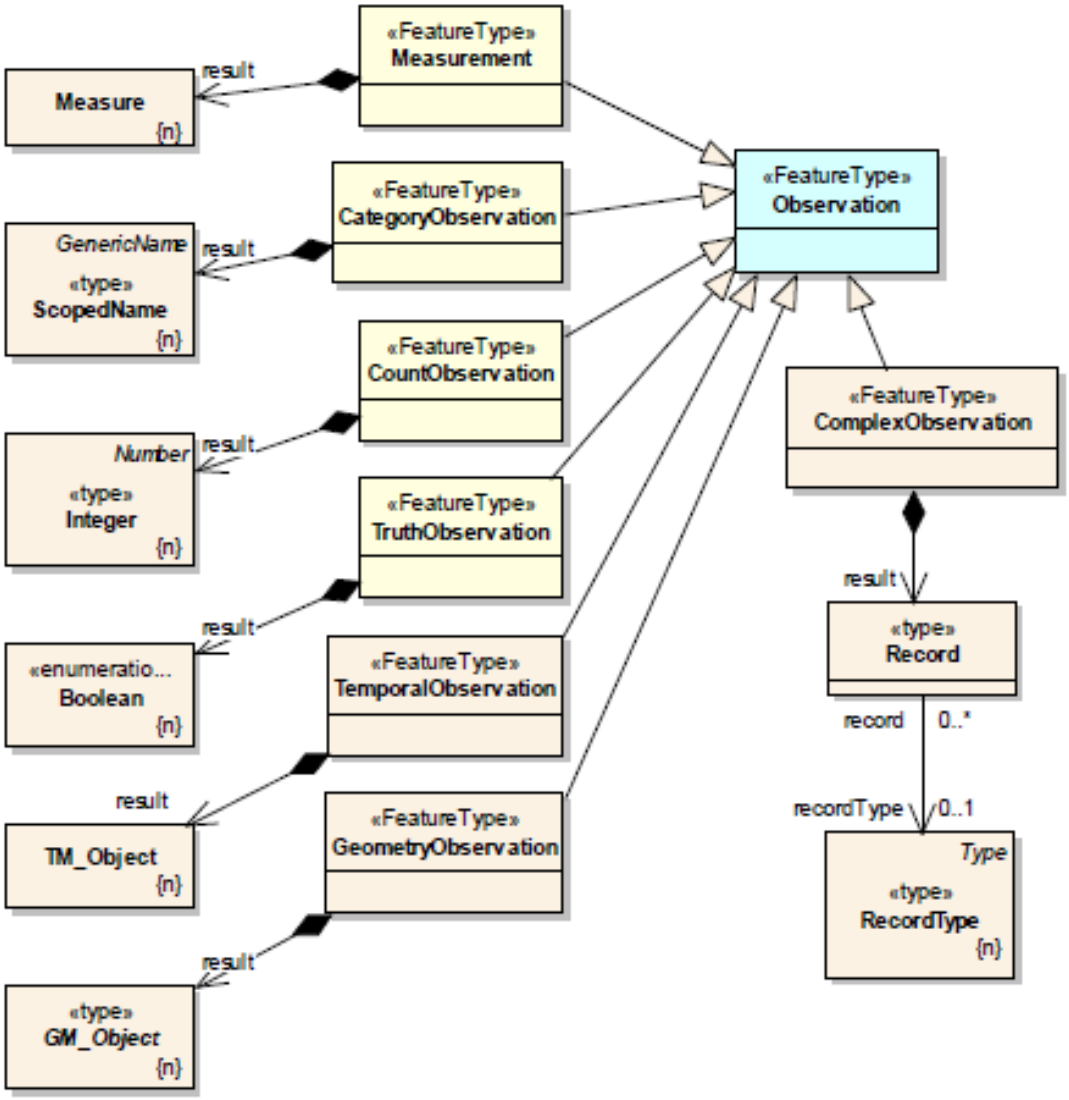
- Conceptual data model for observations and measurements
- Common ontology for the sensor and observations systems
- Objects
  - Feature of interest
  - Observation result
  - Observed property
  - Estimation of a value of that property

ISO 19156 – Observation and measurement - A model

- UML class diagram
- Class Observation
- Class Process

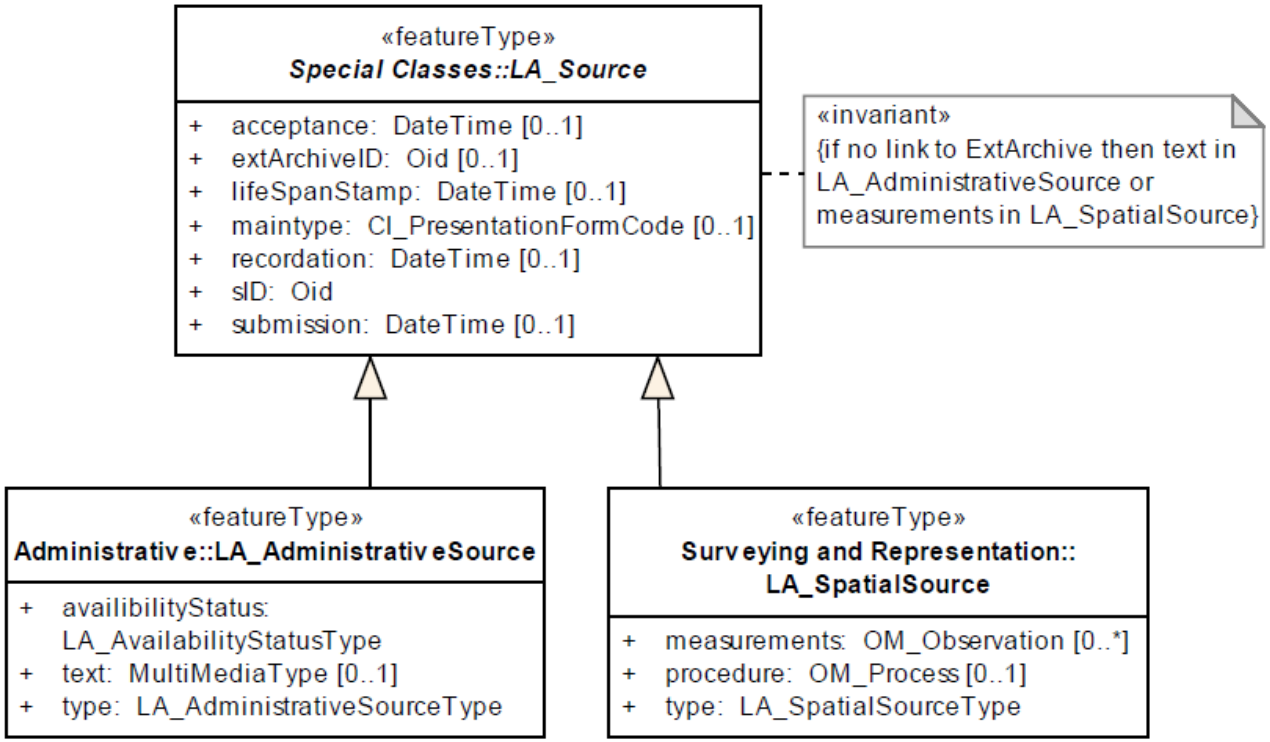


Observation sub-classes



ISO 19152 - LADM

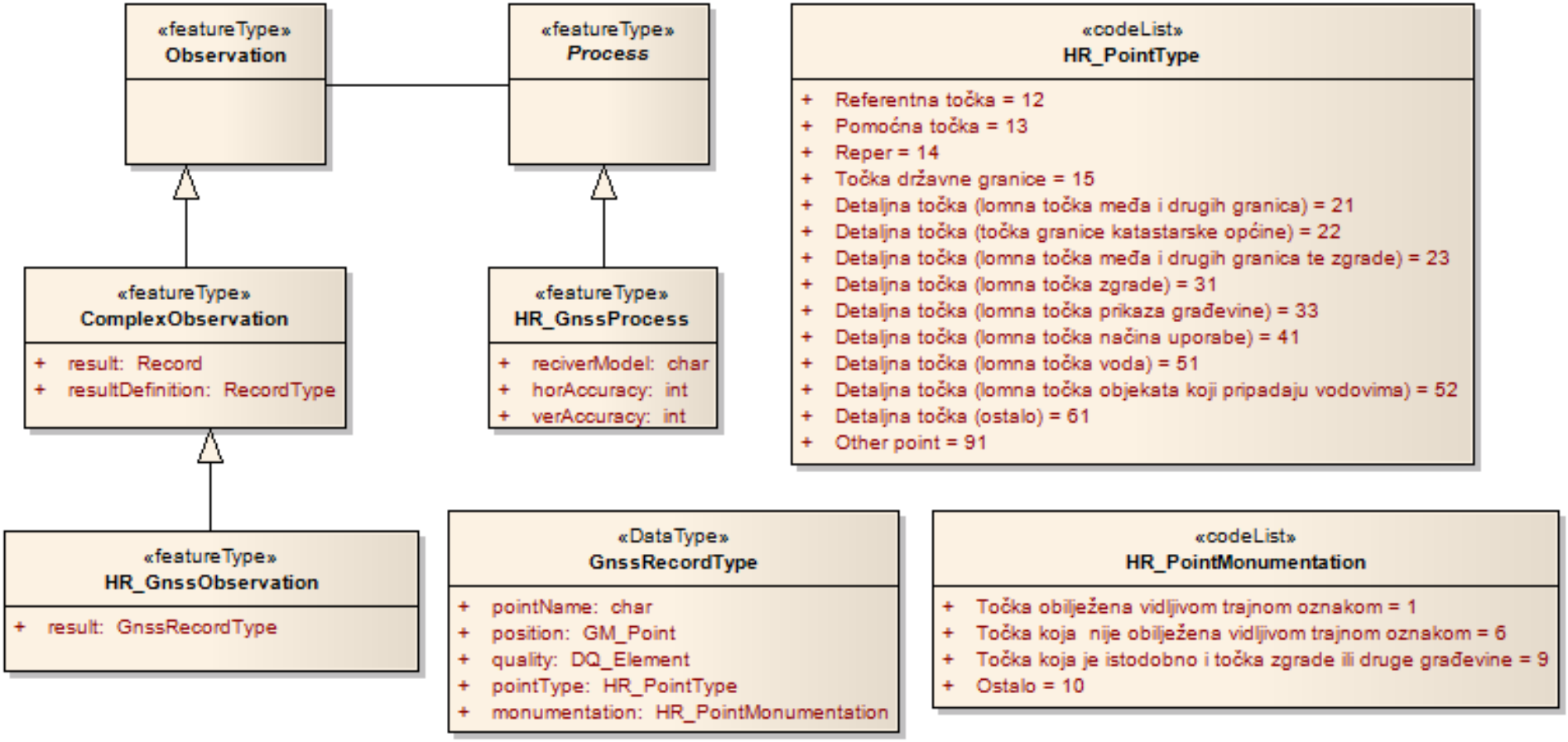
- Land Administration Domain Model – LADM
  - Modelling of land administration systems
  - Class LA_SpatialSource – relation to ISO 19156



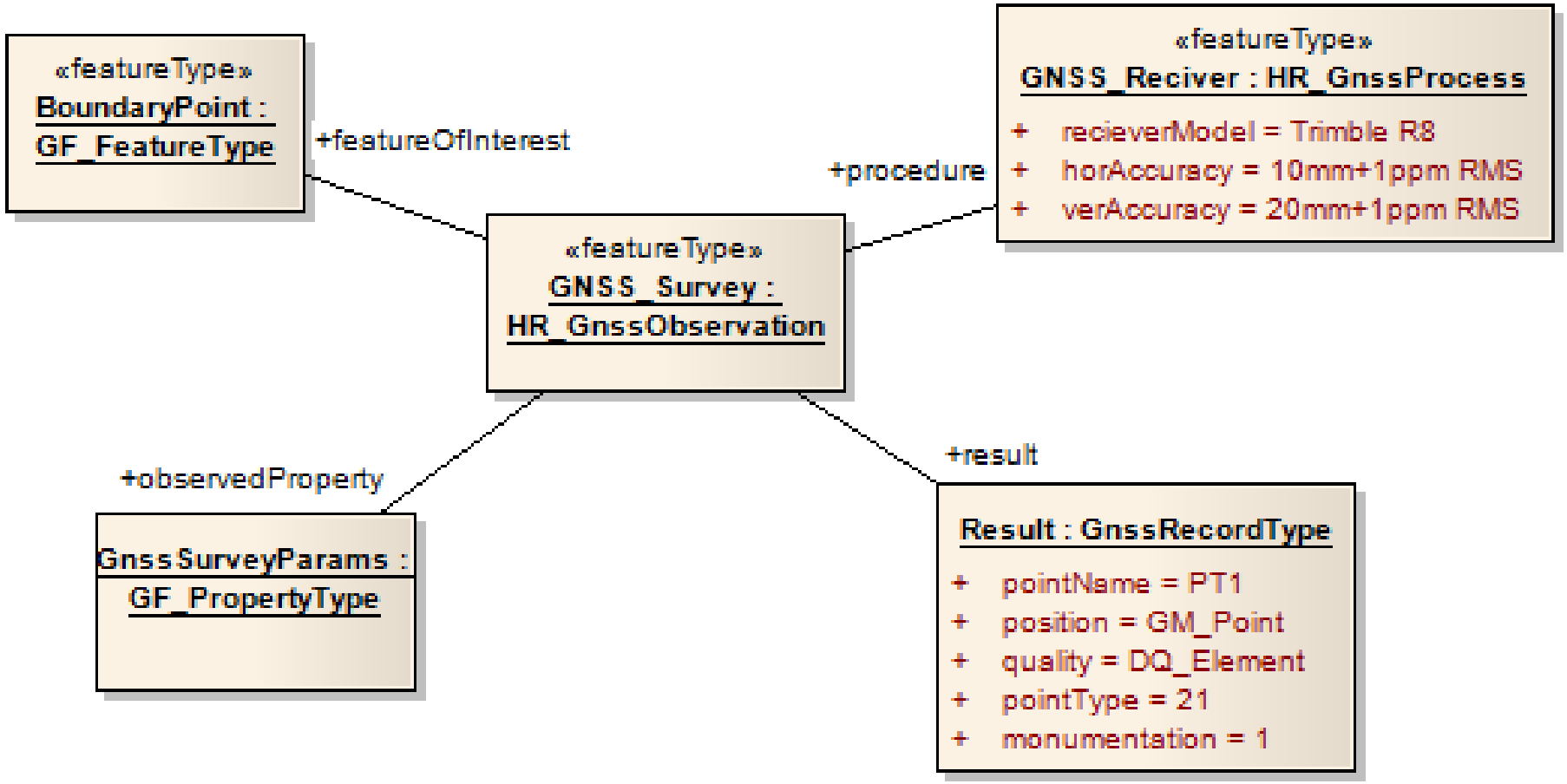
Land survey in Croatia

- Regulations define
  - How survey should be done
  - Which precision has to be satisfied
  - Which metadata should be acquired on the field
- Current practice of archiving geodetic projects
- Technical specifications for determination of coordinates
  - Precisely defined way of measurements
  - Precisely defined data format for list of point coordinates
- Basis for implementation of information system

Definition of a model for GNSS observation



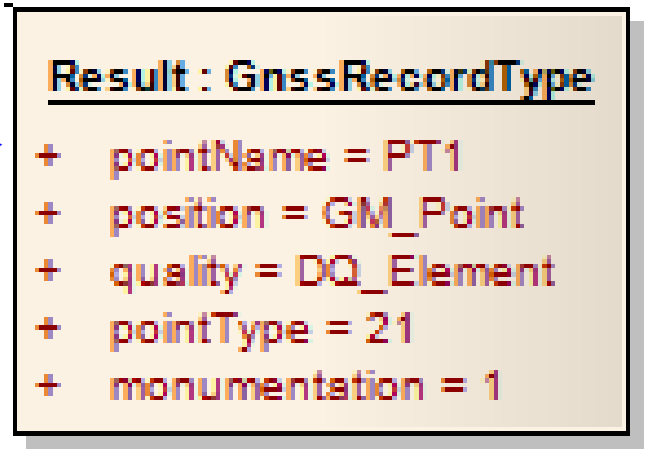
Implementation of a model – UML object diagram



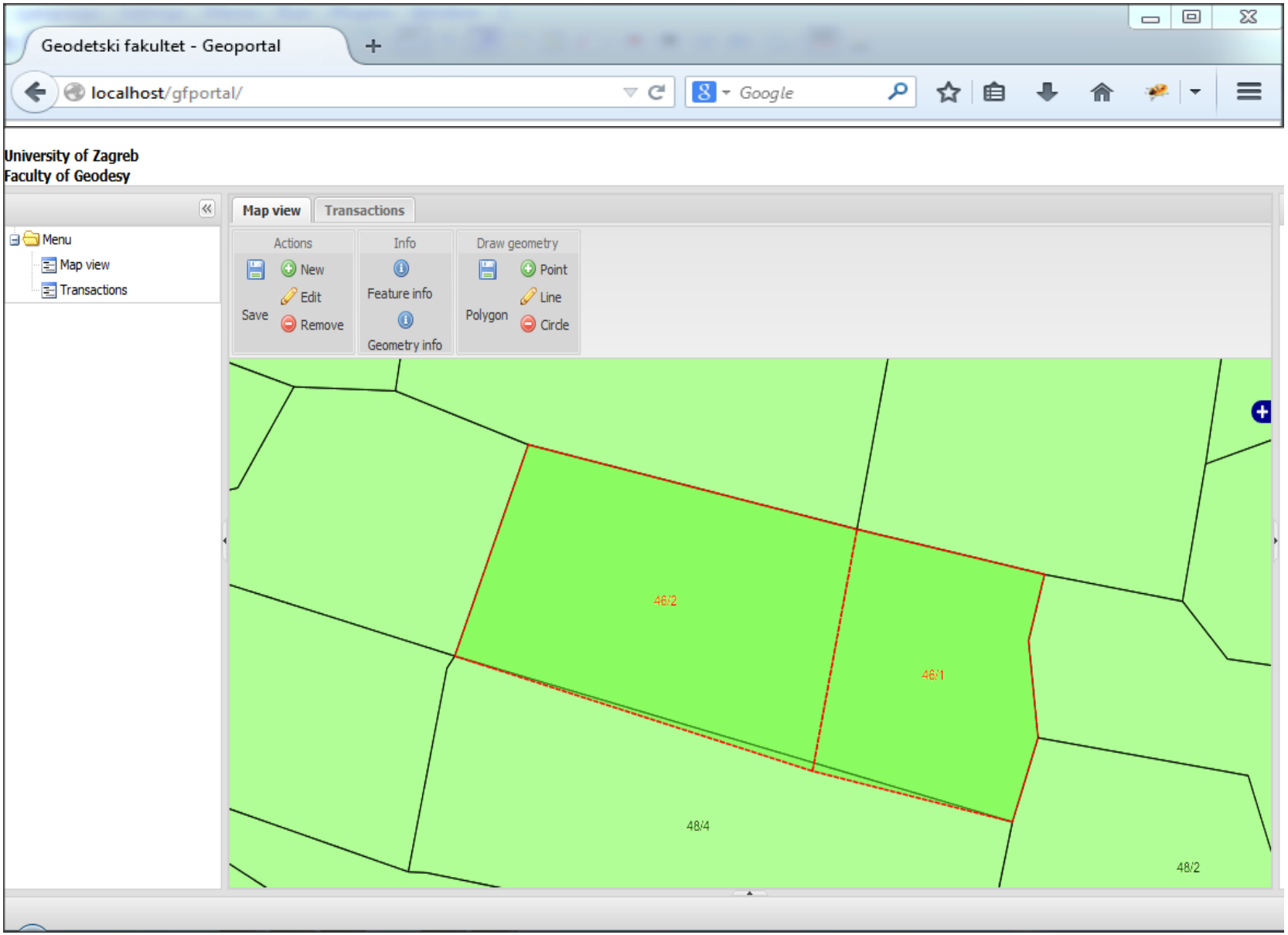
Example of a GML file

```
<?xml version="1.0" encoding="UTF-8"?>
<hr:HR_GnssObservation
gml:id="gnssObservation1"
xmlns:gml=http://www.opengis.net/gml/3.2
xmlns:om=http://www.opengis.net/om/2.0
xmlns:hr=http://www.pg.geof.unizg.hr/schemas/omHr/1.0
xmlns:xlink=http://www.w3.org/1999/xlink
xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance
xsi:schemaLocation="http://www.pg.geof.unizg.hr/schemas/omHr/1.0
http://www.pg.geof.unizg.hr/schemas/omHr/1.0/HR_GnssObservation.xsd">
  <om:phenomenonTime>
    <gml:TimeInstant gml:id="phenomTime1">
      <gml:timePosition>2014-02-27T08:30:00</gml:timePosition>
    </gml:TimeInstant>
  </om:phenomenonTime>
  <om:resultTime>
    <gml:TimeInstant gml:id="resTime1">
      <gml:timePosition>2014-02-27T08:32:00</gml:timePosition>
    </gml:TimeInstant>
  </om:resultTime>
```

```
  <om:validTime>
    <gml:TimePeriod gml:id="vTime1">
      <gml:beginPosition>2014-02-27T08:32:00</gml:beginPosition>
      <gml:endPosition>2016-01-01T12:00:00</gml:endPosition>
    </gml:TimePeriod>
  </om:validTime>
  <om:procedure xlink:href="HR_GnssProcess.xml"/>
  <om:observedProperty
    xlink:href="http://www.pg.geof.unizg.hr/schemas/omHr/1.0/
boundaryPoint.owl#Properties"/>
  <om:featureOfInterest
    xlink:href="BoundaryPoints.xml#boundaryPoint1234"/>
  <om:result/>
    <hr:result>
      <hr:pointName>1</hr:pointName>
      <hr:position gml:id="mednaTocka.1">
        <gml:pos>485235.10 5580147.64</gml:pos>
      </hr:position>
      <hr:quality/>
      <hr:pointType>21</hr:pointType>
      <hr:monumentation>1</hr:monumentation>
    </hr:result>
  <hr:method/>
</hr:HR_GnssObservation>
```



Future work

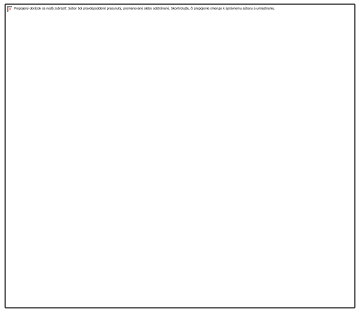

Geodetski fakultet - Geoportal
localhost/gfportal/
Google
University of Zagreb
Faculty of Geodesy
Menu
Map view
Transactions
Map view
Transactions
Actions
New
Edit
Remove
Save
Info
Feature info
Geometry info
Draw geometry
Point
Line
Circle
Polygon
46/2
46/1
48/4
48/2

Conclusion

- In this paper we analyzed two ISO standards related to the cadastre and land survey
- Conceptual model for land survey data – definition
- Structured data – advantages:
  - Easier usage, exchange and integration of data
  - Increased level of quality, consistency and integrity
  - More efficient error detection
- Structured data – disadvantages
  - A lot of effort in definition of a model
  - Transition from well established practice?!
- Why even bother to use this model?

Thank you for your attention.

Questions?



Faculty of geodesy
Institute for applied geodesy
Chair for land survey

Saša Vranić, mag. ing. geod. et geoinf.
Assistant/PhD student
Skype: svranic2003
email: svranic@geof.hr
www: http://www.geof.unizg.hr/~svranic/