

## Questionnaire for the development of ISO 19152:2012 LADM Valuation Module

The ISO 19152:2012 Land Administration Domain Model (LADM) presents a conceptual schema for the specification of property units and their legal and geometric characteristics recorded at cadastre and land register, and relates these datasets with other property related datasets (e.g. addresses, utility networks, building (units), valuation, taxation, land use, land cover) recorded at external registrations.

A recently initiated collaborative research aims at developing a LADM based international information model for one of these external registrations, namely in terms of a Valuation Module for the ISO 19152:2012 LADM. The purpose of this research is to define the semantics of valuation information maintained by public authorities especially for recurrent taxes on immovable property<sup>1</sup>, and to extend the scope of LADM from a fiscal perspective to provide an information model that could be used to construct information systems for immovable property valuation. The preliminary results of this research were documented at the 11<sup>th</sup> 3D Geoinfo Conference<sup>2</sup>.

This questionnaire is prepared as a part of methodology applied for the above-mentioned research which is also supported by FIG Presidency and Chair of FIG Commission 9 Valuation and the Management of Real Estate. The purpose of the questionnaire is to create a world-wide inventory that reveals commonalities and differences among valuation systems used for recurrently levied immovable property taxes. The result of the questionnaire is expected to provide an understanding of the situation of valuation systems, and will be used as source data for the elaboration of the LADM Valuation Extension Module.

Please reply the following questions, and contact us if you have any comments and suggestions:

Volkan Cagdas: [volkan@yildiz.edu.tr](mailto:volkan@yildiz.edu.tr)

Peter van Oosterom: [P.J.M.vanOosterom@tudelft.nl](mailto:P.J.M.vanOosterom@tudelft.nl)

Erik Stubkjær: [est@land.aau.dk](mailto:est@land.aau.dk)

---

<sup>1</sup> Recurrent taxes on immovable property covers taxes levied regularly in respect of the use or ownership of immovable property. These taxes are levied on land and buildings, in the form of a percentage of an assessed property value based on a national rental income, sales price, or capitalised yield; or in terms of other characteristics of real property (e.g., size or location) from which a presumed rent or capital value can be derived. They can be levied on proprietors, tenants, or both; they can also be paid by one level of government to another level of government in respect of property under the jurisdiction of the latter (The OECD classification and interpretative guide 2015, <http://www.oecd.org/tax/tax-policy/oecd-classification-taxes-interpretative-guide.pdf>)

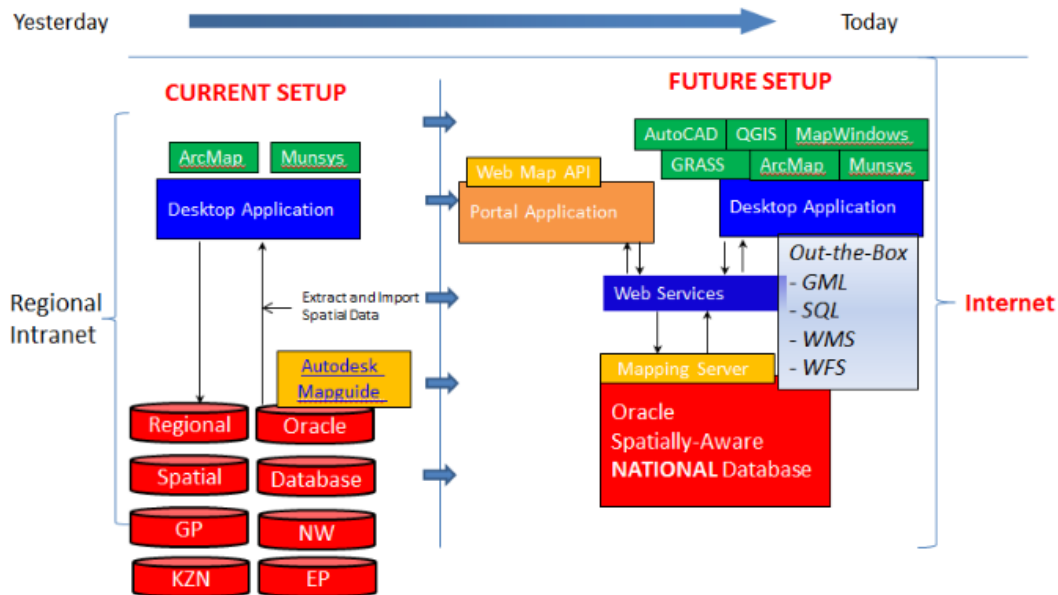
<sup>2</sup> For more information, see: <http://www.isprs-ann-photogramm-remote-sens-spatial-inf-sci.net/IV-2-W1/145/2016/>

## Section A. General questions for property valuation systems in SouthAfrica

| Questions   | Responses   |
|---|---|
| <p>1. Please indicate the organizations responsible for valuation of properties for property taxation purposes?</p> | <p>The property tax (known as ‘rates on property’) is a local tax (provinces are prohibited from levying property tax) and it is levied by municipalities in all provinces.</p> <p>In metropolitan areas, the metropolitan local councils levy and collect property rates; in non-metropolitan areas, only urban municipalities levy property taxes. National and provincial governments regulate how the property tax is charged, assessed, and collected</p>  |
| <p>2. What are the objects of valuation for property taxation (e.g. unimproved parcel, building)?</p>               | <p>The comparable sales method is used to value the land. This method attempts to estimate the price that would be paid by a willing buyer to a willing seller in an arm’s length transaction</p> <p>The valuation roll contains information on the valuation or revaluation. The roll shows the name of the owner, a description of the property, the size of the property, the value of the land, and the value of the improvements</p> <p>a)Land size in square metres;<br/> b)Floor size of building in square metres;<br/> c)Overall condition of property;<br/> d)Architectural design;<br/> e)Quality of finishes;<br/> f)Location;<br/> g)Topography<br/> ;h)Neighbourhood;<br/> i)Proximity to main roads and other facilities</p> |
| <p>3. Please define value type (e.g. market value, tax value, capital value) used for property taxation?</p>        | <p>.“Unimproved land value” is defined as “the amount which such land or right in the land would have realized if sold on the date of valuation in the open market by a willing seller to a willing buyer.”</p> <p>“Site value” is defined in the same way except that it is assumed that the improvements had not been made. The value of improvements is determined by subtracting the site value of land from the</p>  |

|   |   |
|---|---|
|   | <p>improved value.</p> <p>Taxes would be at a value that is closer to market value for those properties that have appreciated or depreciated significantly</p>  |
| <p>4. Please explain how public registry datasets (e.g. cadastre, land registry, building registry) are used in valuation procedures?</p>   | <p>GijimaSouth African eCadastre System</p> <ul style="list-style-type: none"> <li>•Centrally managed, authoritative database</li> <li>•Incorporates 8 Provincial cadastral datasets</li> <li>•Supports title deed transactions and maintenance of new eCadastre</li> <li>•Incorporating 300mil title deeds documents in TIFF format, scanned</li> <li>•Maintain and process 20mill exponential growing land parcels</li> </ul> |
| <p>5. Which methods are applied for collecting market data needed for valuation?</p>  | <p>Various. The Government has the power to obtain information on lease transactions from non-domestic occupiers</p>  |
| <p>6. Is there any special valuation database for storing datasets <i>used in</i> (e.g. property characteristics) or <i>produced with</i> (e.g. sales statistics) valuation procedures? If yes, please give the name of database, indicate responsible authority, and describe its content.</p> | <p>Gijima South African eCadastre System</p> <ul style="list-style-type: none"> <li>•Centrally managed, authoritative database</li> <li>•Incorporates 8 Provincial cadastral datasets</li> </ul>  |
| <p>7. Is there a web-based dissemination of valuation information? If yes, please indicate which data (e.g. sales statistics) is open to the public.</p>  | <p>yes</p> <p>Ex: A G I S - Agricultural Geo-Referenced Information System. The Agricultural Geo-referenced Information System (AGIS) strives to offer a one-stop information service for the agricultural sector in South Africa. Using interactive WEB-based applications, AGIS provides access to spatial information (maps), industry specific information and decision support tools.</p>                                  |
| <p>8. How frequently are general revaluations made?</p>   | <p>A general valuation must be undertaken at least once in a four-year period in most provinces; in two provinces, the period is 5 years.</p> <p>The system is poorly administered in many municipalities and, in some cases, comprehensive re-valuations have not been undertaken for 10 years or longer.</p>  |

|   |  |
|---|--|
|   | <p>For example, in the Cape, up until 1993, the period between revaluations was 10 year</p>  |
| <p>9. Is there a system of indexation affecting property value between regular revaluations?</p>                                | <p>Capital value is used as the basis for valuation. Local government councils have the option to choose between at least two of the following tax bases:</p> <ul style="list-style-type: none"> <li>•site rating (rating on unimproved land only);</li> <li>•flat rating (rating the improved value of the land); and</li> <li>•composite or differential rating (rating both land and improvements but at different rate levels).</li> </ul>   |
| <p>10. Do taxpayers have a right to appeal against the appraised values? If yes, please indicate how disputes are resolved.</p> | <p>There is no informal inquiry stage but taxpayers can submit written objections within a specified time period. The valuation board hears objections and takes a decision before certifying the roll.</p> <p>There is also a valuation appeal board to hear appeals. In terms of enforcement, local governments may collect interest on arrears. A clearance certificate is required before any formal transfer can take place.</p> <p>Finally, seizure and public sale by city council can take place after three years</p> |



Source : oracle spatial and graph user conference

Please continue with Section B, if mass appraisal procedures are applied in your country for immovable property taxation. If single property appraisal methods are used -even if as complementary part of mass appraisal, please answer questions given in Section C.

### Section B - Questions for mass appraisal procedures

| Questions  | Responses   |
|--|---|
| 1. Do you have a (computer aided) mass appraisal system in your country? If yes, please indicate also responsible authorities.                                 | Yes   |
| 2. Is there any other use of the mass appraisal system than property taxation?   | Yes   |
| 3. Which CAD/GIS/CAMA (Computer-aided design / Geographic information system / Computer Assisted Mass Appraisal) software packages are used in mass appraisal? | current property valuation and property tax assessment, as described in Section 46 and other related Sections of Act 6 of 2004, is done according to CAMA or MAS (mass appraisal systems)principles |
| 4. Which geographical or spatial datasets are used in mass appraisal? Please describe the source of these datasets.  | At present, property tax assessment is based on the CAMA system, which dependson correct, suitable, and up-to-date information, as well as data on properties as stated in MPRA 6 of 2004           |
| 5. Which geographic or spatial analysis methods (e.g. visibility analysis, proximity analysis) are applied in mass appraisal?                                  | A large amount of "spatial and non-spatial" data were handled through this method but currently there is no proper system to verify, document and identify the quality and amount of data issued.   |
| 6. Is three-dimensional (3D) data used in mass appraisal? Please describe source of 3D data (e.g. floor plans).  | Yes, the floor plans are already being used Aerial Photographs (3D)   |

|   |  |
|---|--|
| 7. Is there any relationship between the CAMA system and other public registers (e.g. cadastre, land registry, building registry, ..)?  | Yes cama system links with GIS based systems and these are linked to land registry   |
| 8. Please describe the statistical models (e.g. additive, multiplicative) applied in mass appraisal according to type or functions of properties?   | Multiplicative model are being used with mass appraisal. property tax is calculated by the sum of the market value corresponding to each class of value multiplied by its respective rate  |
| 9. Please indicate statistical analysis methods (e.g. multiple regression analysis, artificial neural network) applied in mass appraisal?   | The Additive Multiple Regression Model (AMRA) has been developed and used. The objective of AMRM, as applied to mass appraisal, is to model the relationship between property characteristics (independent variables) to property value (dependent variable), so that the latter can be estimated from the former.   |
| 10. Which legal characteristics (e.g. property rights) are used as variables in mass appraisal models? Please describe the source of these characteristics.   | legal characteristics like mortgages are used  |
| 11. Which land use characteristics (e.g. land use zones) are used as variables in mass appraisal models? Please describe the source(s) of these characteristics.  | cbd and non cbd area   |
| 12. Which environmental and locational characteristics (e.g. location nuisance, distance to points of interest / POIs, environmental risks) are used as variables in mass appraisal models? Please describe the source(s) of these characteristics. | nearness to the river, traffic connection / infrastructure parking space parks and green areas age of building within a district shopping centers markets retails traffic noise and pollution playgrounds cultural,entertainment and sport points prestige planned future development distance from cbd, distance from the mrt etc   |
| 13. Which building or improvement characteristics (e.g. number of unit, construction type and material) are used as variables in mass appraisal models? Please describe the source(s) of these characteristics.                                     | Identification (plot number) Location Land description (area, permitted use) Building description (area, age, materials, quality) Taxpayer (not essential)   |
| 14. Does the mass appraisal system applied in your country have a performance analysis stage (e.g. 'ratio study')? If yes, please describe the indicators used in the performance analysis.   | The sales analysis system is a valuable tool for monitoring appraisal results,identifying revaluation priorities, adjusting valuation to the market, and assisting management in planning and scheduling.<br>Gloudemans (1999)stated that the mass system was a vital tool to analyse components for sales data collection, sales screening and processing, ratio studies, and sales reporting.Ratio studies generally provided the best available measures of appraisal performance |
| 15. Please indicate whether single property appraisal is applied for improving accuracy of mass appraisal estimations.  | The commissioner of municipal Administration to improve Accuracy of the AV of properties frequently to reflect the changes in the market rental values of comparable properties. so single property appraisal is done only when there is change of the usage of the property and has been  |

|  |                        |
|--|------------------------|
|  | notified after change. |
|--|------------------------|

### Section C. Questions for single property valuation procedures

| Questions   | Responses  |
|---|--|
| 1. Which valuation methods are used for single property appraisal? Please relate valuation methods with the type of valuation objects (e.g. sales comparison approach for unimproved parcels).                                      | yes<br>hedonic models with AV  |
| 2. Which geographical or spatial datasets are used for single property appraisal? Please describe the source(s) of these datasets.  | yes  |
| 3. Which legal property characteristics (e.g. property rights) are taken into account for single property appraisal? Please describe also the source of these characteristics.  | Mortgages  |
| 4. Which land use characteristics (e.g. land use zones) are taken into account for single property appraisal? Please describe also the source(s) of these characteristics.  | cbd and non cbd area   |
| 5. Which environmental and locational characteristics (e.g. location nuisance, distance to POIs, environmental risks) are taken into account for single property appraisal? Please describe the source(s) of these characteristics. | Nearness to the river, traffic connection / infrastructure parking space parks and green areas age of building within a district shopping centers markets retails traffic noise and pollution playgrounds cultural |
| 6. Which building or improvement characteristics (e.g. number of unit, construction type and material) are taken into account for single property appraisal? Please describe the source(s) of these characteristics.                | Identification (plot number) Location Land description (area, permitted use) Building description (area, age, materials, quality)  |
| 7. If there is a special valuation database, please indicate which sales comparison method related data (e.g. comparable property identifiers, monetary adjustment for time, physical differences) are kept in this database.       | yes, comparable property identifiers   |
| 8. If there is a special valuation database, please indicate which cost method related data (e.g. type and source of cost price, chronological age, depreciations) are kept in this database.                                       | yes - depreciation<br>Usually a charge is levied per square metre of land area or per square metre of building floor area, or both   |
| 9. If there is a special valuation database, please indicate which income valuation method related (e.g. gross income, net income, capitalization rate, discount rate) are kept in this database.                                   | yes , capital improved value   |



**Section D. Information concerning respondent(s)**

| <b>Questions X..Y</b> have been answered by | <b>Respondent</b>  |
|---|--|
| 1. Name                                     | Manohar Velpuri  |
| 2. Affiliation / position                   | FIG commission 9, Vice chair   |
| 3. Country                                  | Denmark/Singapore/India  |
| 4. E-mail                                   | manohar.velpuri@gmail.com  |
| 5. Comments                                 | Sources : A Valuation Model on Residential Property for Tax Assessments H Visser |

| <b>Questions Z..A</b> have been answered by | <b>Respondent</b> |
|---|-------------------|
| 1. Name                                     |                   |
| 2. Affiliation / position                   |                   |
| 3. Country                                  |                   |
| 4. E-mail                                   |                   |
| 5. Comments                                 |                   |