SLOVENIAN „COLLECTIVE CADASTRE OF PUBLIC INFRASTRUCTURE“ – ITS ESTABLISHMENT AND...
ITS UPDATE IN PROGRESS...

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BASIC FACTS....

➢ Public infrastructure: real estate facilities connected into networks → to supply modern society’s needs of: water, energy, need to transport, to communicate,...

➢ Cadastre: a comprehensive recording of the real estate.

➢ Collective Cadastre of Public Infrastructure: real estate database of various sorts of public infrastructure – in the territory of Republic of Slovenia established and maintained by Surveying and Mapping Authority (SMA) of Republic of Slovenia since 2005.
PURPOSE AND GOALS....

➢ to provide comprehensive information about occupancy of space by public infrastructure around us – in the air, on the ground and especially underground.

➢ Prevention of unnecessary damage at ground works,
➢ Support in spatial planning processes,
➢ Link to more detailed data (infr. manager’s cadastres/registers).
ROLE OF COLLECTIVE CADASTRE

C. Cadastre of public infrastructure joins "producers" and users of spatial data.
**HISTORY**

- **1968 – Cadastre of communal facilities Act (Amendment in 1974)**

  - Cadastre is run and maintained by local surveying authorities, data is mostly drawn on topographic – cadastral maps:

  - problems: 1. data about infrastructure is dispersed + very inconsistent, 2. almost no use of data for different purposes (spatial planning,...),...
HISTORY

- **June 1991** – Republic of Slovenia – independant country

- **1995** – Surveying and mapping authority becomes government service (within Ministry of Environment and space)
DEFINITION BY LEGISLATION

➢ 2002 – Spatial Management Act (Amendments in 2017 and 2022):
  - „public infrastructure“ gets its definition,

➢ 2002 – Construction Act
  - Additional demands/procedures about public infrastructure: how to build it, to connect to it, obligation to report data to Collective cadastre.

➢ 2004 – Rules on the Contents and the Manner of Maintaining the Actual Land Use Database
  - Detailed rules about public infrastructure data to be kept in Collective Cadastre

➢ 2007 – Spatial Planning Act
  - Each manager of public infrastructure is obliged to:
    - 1. run its own cadastre and
    - 2. report data (not all, specified - with 25 attributes) to Collective Cadastre, established & run by SMA.
CREATION of the C. CADASTRE

Surveying and Mapping Authority of R. of Slovenia (SMA) – Real Estate databases:

- Land cadastre
- Buildings cadastre
- Collective Cadastre of public infrastructure
INFRASTRUCTURES IN C. CADASTRE

1. **TRAFFIC INFRASTRUCTURE** (roads and mount. paths, railways, airports, harbours, cable cars)

2. **ENERGY INFRASTRUCTURE** (power lines, natural gas supply, heat supply, petroleum industry)

3. **COMMUNAL INFRASTRUCTURE** (fresh water supply, sewage system, waste management)

4. **WATER INFRASTRUCTURE** (river regulations, irrigation systems,...)

5. **INFRASTRUCTURE FOR MONITORING OF NATURAL PHENOMENA, NATURAL RESOURCES, ENVIRONMENT CONDITION, MANAGEMENT OF OTHER NATURAL RESOURCES...** (measurement stations, mining,...)

6. **OTHER INFRASTRUCTURE IN PUBLIC USE** (telecommunication networks, network termination points)

- These 6 groups of infrastructure has following legislation (within responsible Sectors/Ministries) which refers to them:
SECTORAL LEGISLATION 1/2

- Roads Act (2010),
- Act Regulating the Records of the Existing Land Use of the Public Road and Railway Infrastructure (2018), and the Rules (2019),
- Rules about Forest Roads (2009),
- Rules about the method of graphically presenting mountain paths (2008, 2018),
- Energy Act (2014, 2019),
- Environmental protection Act (2004),
SECTORAL LEGISLATION 2/2

✓ Water Act (2008),
✓ Rules about laying down water infrastructure (2005),
✓ Rules on the Cadastres of Public Infrastructure for Environmental Public Services (2011, 2017),
✓ National Meteorology, Hydrology, Oceanography and Seismic Service Act (2017),
✓ Ordinance determining referential measurement stations for meteorological, hydrological, oceanographic and seismic monitoring (2018),
✓ Electronic Communications Act (2017),
✓ Rules of the management and content of data on communication networks and associated infrastructure, network termination points and other electronic communication networks (2018).
DATA MODEL

➢ Every object as:
  - Point
  - Line or
  - Polygon (closed polyline).

➢ Geometry: as 2,5D model (2D geometry, height as one of attributes – „Z“).

➢ 2D geometry: D96/TM (ESRS) national coordinate system (since 2019),

➢ Heights: ortometric, atribut „Z“ always the top of the object...
### Attributes of Objects...

- **20 universal + 5 „special”:** identifiers, type of object (codelist), its dimensions, height, source of data (method), position&height accuracy, manager’s company registration number, additional description, ...


<table>
<thead>
<tr>
<th>ZAP. ST</th>
<th>ATTRIBUT</th>
<th>ORIS_ATTRIBUTA</th>
<th>FORMAT ZAPISA</th>
<th>OSTANT VREDNOSTI</th>
<th>ATRIBUTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TIP_SPG</td>
<td>To spremenljive podatkov</td>
<td>1C</td>
<td>SREDNJI spremenljiv</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ID</td>
<td>Evidenčna identifikacijska številka objekta v sistemu ZK GJU</td>
<td>10N</td>
<td>SREDNJI spremenljiv</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ID_UPR</td>
<td>Evidenčno identifikacijska številka objekta v sistemu kataloške upravljavca (MAT_ST), in v sistemu ZK GJU za tekoče vprašanje (MAT_ST)</td>
<td>20C</td>
<td>SREDNJI spremenljiv</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SJIF_VRSTE</td>
<td>Vrsta objekta</td>
<td>4N</td>
<td>SREDNJI vrednost</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CC_KLAS</td>
<td>Tip vrste objekta po CC-Klasifikaciji</td>
<td>5N</td>
<td>SREDNJI vrednost</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CADPO</td>
<td>Tehtodipla oblike objekta</td>
<td>1N</td>
<td>SREDNJI vrednost</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>NAT_YX</td>
<td>Natančnost dotikove podobne objekte (na koordeinate)</td>
<td>2N</td>
<td>SREDNJI vrednost</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Z</td>
<td>Alkoholna nadzorska višina terenske objekte</td>
<td>7NG</td>
<td>SREDNJI vrednost</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NAT_Z</td>
<td>Natančnost dotikove nadzorske višine terenske objekte</td>
<td>2N</td>
<td>SREDNJI vrednost</td>
<td></td>
</tr>
</tbody>
</table>
WHO: Managers of public infrastructure, or: their authorized representatives (infr. maintenance companies, surveying companies)

FORM: as an „elaborat“ – consists of: „written“ part:

A REQUEST:

AUTHORIZATION FROM MANAGER OF INFR. (if needed):

AUTHORIZED SURVEYOR STATEMENT (if needed):
2. digital data: 3 allowed formats:

✓ Arc/Info 'generate' **format (ASCII format)**, with coordinates,
✓ shape file (**.SHP**),
✓ GML file (**.GML**).

Since 2018 also **.xml** – detailed data about pipes, cables, fibres (only at Electronic communication infrastructure):

```xml
<?xml version='1.0' encoding='UTF-8' ?>
  <gurs:ID_K/>
  <gurs:ID_UPR_K>1K</gurs:ID_UPR_K>
  <gurs:ID_C/>
  <gurs:ID_UPR_C/>
  <gurs:ID_TR/>
  <gurs:ID_UPR_TR>1</gurs:ID_UPR_TR>
  <gurs:SIF_VRSTE>6123</gurs:SIF_VRSTE>
  <gurs:ST_VODOV>4</gurs:ST_VODOV>
  <gurs:VRSTA>1</gurs:VRSTA>
  <gurs:MAT_ST>2292912</gurs:MAT_ST>
  <gurs:TIP_SPR>D</gurs:TIP_SPR>
</gurs:Kabi>
```
SMA ACTIVITIES UPON „ELABORAT“....

1. DATA CHECK (of written and digital part),
   if NOT OK: NOTIFICATION OF CORRECTION NEEDED → to manager of infrastructure,

2. If/when OK: NOTIFICATION ABOUT DATA SUBMISSION TO THE CADASTRE → to manager of infrastructure,

3. EVERY OBJECT GETS UNIQUE IDENTIFIER (attribute) IN SMA DATABASE,

4. DATA IS COPIED (replicated) TO DISTRIBUTION DATABASE daily...
DISTRIBUTION OF THE DATA 1/4

➢ PUBLIC VIEW (available at: https://ipi.eprostor.gov.si/jv):
DISTRIBUTION OF THE DATA 2/4

➢ VIEW FOR REGISTERED USERS (registration at the SMA; additional functionalities):
DISTRIBUTION OF THE DATA 3/4

➢ PUBLIC DATA DOWNLOAD: E-SURVEYING DATA
  application:

available at: https://egp.gu.gov.si/egp/?lang=en
DISTRIBUTION OF THE DATA 4/4

DATA DOWNLOAD FOR REGISTERED USERS
(managers of the infrastructure, surveying companies, employees at the SMA,...):

[Image of a map with various annotations and a list of data items]
<table>
<thead>
<tr>
<th>Type</th>
<th>Number of objects</th>
<th>Length of infrastructure [km]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads and mountain paths</td>
<td>159,699</td>
<td>62,430</td>
</tr>
<tr>
<td>Railways</td>
<td>9,409</td>
<td>2,581</td>
</tr>
<tr>
<td>Airports</td>
<td>153</td>
<td>-</td>
</tr>
<tr>
<td>Harbours</td>
<td>1,200</td>
<td>-</td>
</tr>
<tr>
<td>Cable cars</td>
<td>336</td>
<td>23</td>
</tr>
<tr>
<td>Electricity</td>
<td>2,207,443</td>
<td>56,238</td>
</tr>
<tr>
<td>Natural gas</td>
<td>584,399</td>
<td>6,761</td>
</tr>
<tr>
<td>Heat supply</td>
<td>91,403</td>
<td>1,297</td>
</tr>
<tr>
<td>Petroleum industry</td>
<td>218</td>
<td>-</td>
</tr>
<tr>
<td>Fresh water supply system</td>
<td>1,308,986</td>
<td>29,061</td>
</tr>
<tr>
<td>Sewage system</td>
<td>991,511</td>
<td>12,580</td>
</tr>
<tr>
<td>Waste management</td>
<td>4,641</td>
<td>-</td>
</tr>
<tr>
<td>Water infrastructure</td>
<td>11,953</td>
<td>136</td>
</tr>
<tr>
<td>Electronic communications</td>
<td>2,904,740</td>
<td>75,948</td>
</tr>
<tr>
<td><strong>TOGETHER</strong></td>
<td><strong>over 8.2 mio.</strong></td>
<td><strong>over 240,000</strong></td>
</tr>
</tbody>
</table>
1100 - ROADS
2100 – ELECTRICITY-POWER LINES
2200 – NATURAL GAS PIPELINES
3100–FRESH WATER SUPPLY NETWORK
3200- SEWAGE SYSTEM
3300 – WASTE MANAGEMENT
4000 - WATER INFRASTRUCTURE
6100 - ELECTRONIC COMM. NETWORKS
COMPLETENESS OF DATA (an estimation)

LOCAL INFRASTRUCTURE:
- Municipal Roads: 99%
- Sewage System: 96%
- Fresh Water Supply Network: 99%

STATE INFRASTRUCTURE:
- Roads: 100%
- Railways: 100%
- Natural gas supply: 100%
- Water Infrastructure: 85%
- Electricity: 95%

OTHER INFRASTRUCTURE:
- Forest Roads: 100%
- Electronic communications: 85%
THE UPGRADE - PROGRAMME OF THE PROJECTS eProstor (eng. „eSpace“)

FINANCING: The investment is co-financed by the Republic of Slovenia and the European Union from the European Regional Development Fund.

TIME FRAME: Coordinated and high-quality space management and efficient real estate management are to be carried out in the financial perspective 2014-2020 (extended till 30.11.2022).

RESOURCES: The total amount of funds allocated for the programme is 22.4 mio. €, the European Regional Development Fund contributes 17.9 mio. €.

CONTRACTORS: The Surveying and Mapping Authority of the Republic of Slovenia (SMA) and the Ministry of Environment and Space Management, Directorate for Space Management, Construction and Housing.
OBJECTIVES: Greater transparency and efficiency in Spatial Planning, Construction and Real estate Management...

RESULTS EXPECTED: Established IT infrastructure for spatial information and services, which will provide support for the public administration and citizens at spatial planning, construction and real estate management.
SMA ROLE IN THE PROGRAMME:

- renovated real estate databases in terms of unified information,
- established a solution → the modern functioning of the real estate system and represented a unified basic national spatial data infrastructure (already operational for land plots and buildings data):
NEWS AND CHANGES AT THE COLLECTIVE CADASTRE OF PUBLIC INFRASTRUCTURE 1/4

- New data format: **geoJSON** (for geometry: points, lines, polygons) and **JSON** (for attribute data):

```json
{
    "type": "FeatureCollection",
    "name": "tocke",
    "css": {
        "type": "name",
        "properties": {
            "name": "urn:ogc:def:crs:EPSG::3849"
        }
    },
    "features": [
        {
            "type": "Feature",
            "properties": {
                "tockeID": "12345",
                "upravavjeveCevlID": "CEV1",
                "linijaID": "0123",
                "nadrejenaCevlID": "null",
                "vrstaObjekta": 16122,
                "FL": "0.150",
                "tipPrenembe": "D"
            },
            "geometry": {
                "type": "Point",
                "coordinates": [12.345, 67.890]
            }
        },
        {
            "type": "Feature",
            "properties": {
                "tockeID": "67890",
                "upravavjeveCevlID": "CEV2",
                "linijaID": "0123",
                "nadrejenaCevlID": "null",
                "vrstaObjekta": 16122,
                "FL": "0.055",
                "tipPrenembe": "D"
            },
            "geometry": {
                "type": "Point",
                "coordinates": [12.345, 67.890]
            }
        }
    ]
}
```
NEWS AND CHANGES AT THE COLLECTIVE CADAstre OF PUBLIC INFRASTRUCTURE 2/4

▪ Geometry model: **3D for all objects**, 

▪ Attribute changes:

<table>
<thead>
<tr>
<th>Abandoned attributes:</th>
<th>Added attributes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager’s company reg. number → shifted to separate JSON file</td>
<td>Year of construction/last renovation of object</td>
</tr>
<tr>
<td>Height „Z“ → 3D model</td>
<td>Infrastructure Connection point (connection to Buildings Cadastre)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

▪ Data identifiers unified for all real estate databases of SMA (land cadastre, buildings cadastre, collective cadastre),

▪ ...

»Program projektov eProstor«
NEWS AND CHANGES AT THE COLLECTIVE CADASTRE OF PUBLIC INFRASTRUCTURE 3/4

- A new real estate system developed also for Collective cadastre:

  - **Advantages:**
    - Accessible to infrastructure manager’s, surveyors,… → they’ll submit and make some initial checks on the data by themselves,
    - Procedure of data check (by SMA employees) will be easier → 3D data → 3D viewer!
NEWS AND CHANGES AT THE COLLECTIVE CADASTRE OF PUBLIC INFRASTRUCTURE 3/4

✓ Data export will be more simple:
MIGRATION OF DATA IN PROGRESS...
THANK YOU FOR YOUR ATTENTION!

ADDITIONAL INFO:
http://www.gu.gov.si/
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uros.alic@gov.si
simona.smrtnik@gov.si