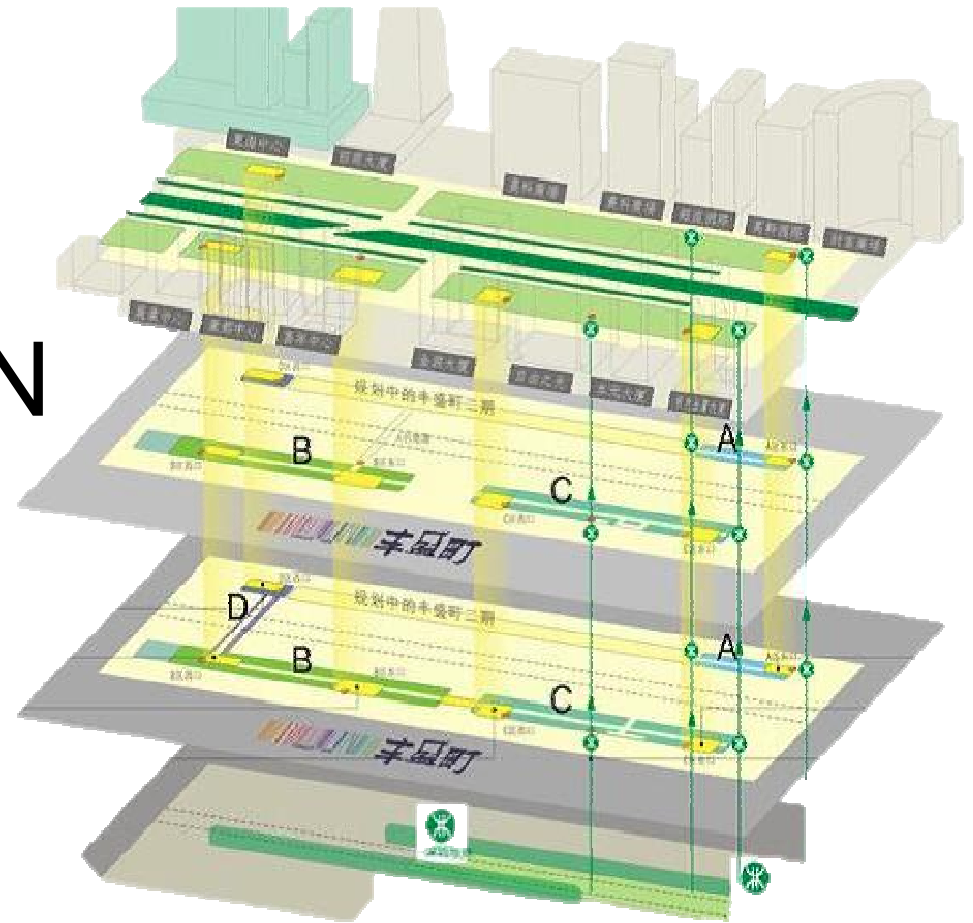


INITIAL REGISTRATION OF 3D PARCELS

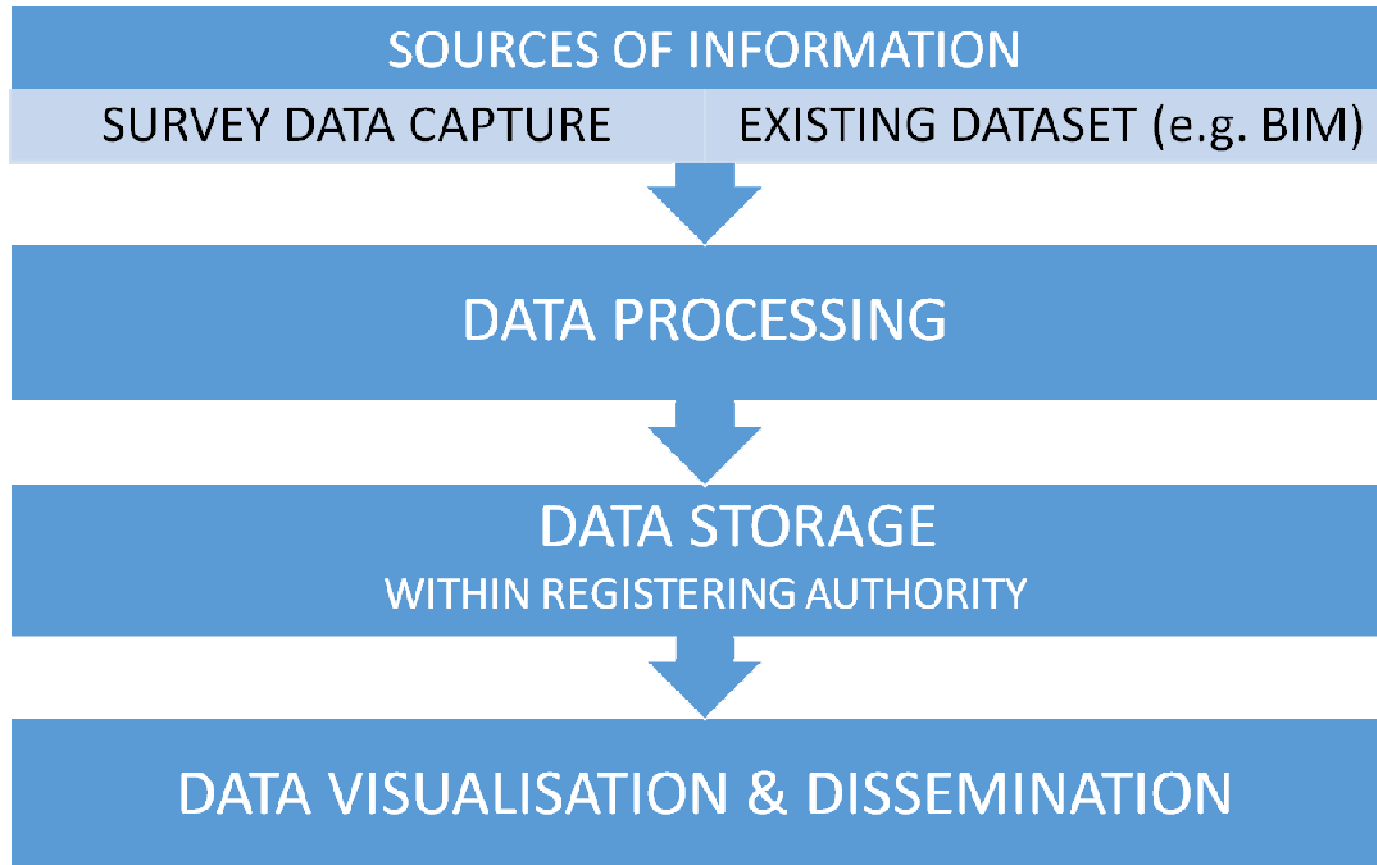
position paper



Efi DIMOPOULOU, Sudarshan KARKI, Roic MIODRAG, Jose-Paulo Duarte de ALMEIDA, Griffith-Charles CHARISSE, Rod THOMPSON, Shen YING and Peter VAN OOSTEROM

5th International FIG 3D Cadastre Workshop 18-20 October
2016, Athens, Greece

CADASTRAL PLAN CYCLE



DATA CUPTURE

Jurisdictions progress towards: PARTIAL IMPLEMENTATION OF 3D CADASTRE

- ✓ 3D data collected in other areas
- ✓ Existing cadastral data



USABILITY
COMPATIBILITY
PORTABILITY

QUESTIONS THAT NEED ANSWERING

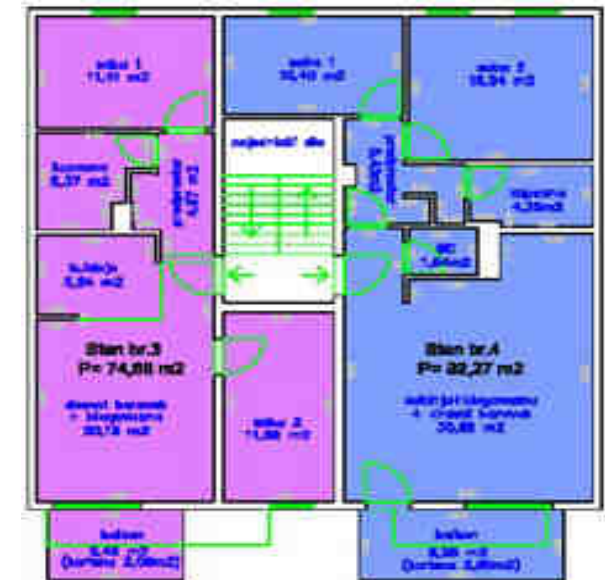
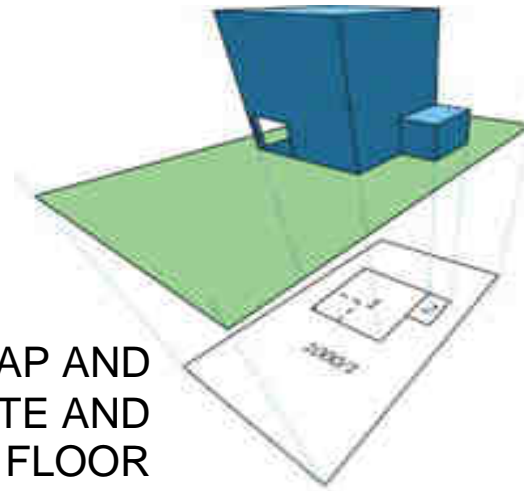
- THE PRIMARY CAPACITY FOR A 3D CADASTRAL SYSTEM IS TO BE ABLE TO REGISTER SPACE AS A SEPARATE ENTITY WITHIN THE CADASTRAL SYSTEM. IT IS NOT AN IMPLICIT 3D COLUMN OF RIGHTS BUT RATHER AN EXPLICIT REGISTRATION OF 3D SPATIAL OBJECT
- THE CADASTRAL JURISDICTION MUST PROVIDE INSTITUTIONAL AND LEGISLATIVE FRAMEWORK TO FACILITATE THE REGISTRATION OF 3D PARCELS AND THE TOOLS FOR LAND PROFESSIONALS TO RECORD AND DISPLAY 3D CADASTRAL DATA WITHIN THE PROVIDED FRAMEWORK
- CONSIDER THE SPHERE OF INFLUENCE WITH AN IMPACT ON 3D REGISTRATION: PLANNERS, SURVEYORS, DATA MANAGERS AND THE REGISTRARS
- MODERN 3D DATA ACQUISITION TECHNIQUES, APPROPRIATE LEVEL OF COMPLEXITY WITHIN JURISDICTIONS, VALIDATION REQUIREMENTS AT VARIOUS LEVELS OF MATURITY..
- CERTAINTY OF OWNERSHIP, PROTECTION OF RIGHTS OF 3D PARCELS, UNAMBIGUOUS SPATIAL LOCATION, VALUABLE FINANCIAL INSTRUMENTS
- WHAT ARE THE BENEFITS? WHAT ARE THE CURRENT TRENDS?

CURRENT PROCEDURES AND WORKFLOWS OF REGISTRATION OF 3D PARCELS IN VARIOUS COUNTRIES

THERE ARE NO IMMEDIATE PLANS TO UPGRADE THE EXISTING 2D CADASTRE TO A 3D CADASTRE

CROATIA: DOCUMENTATION WITH A SPATIAL REPRESENTATION (2.5D) OF SEPARATE PARTS OF THE WHOLE PROPERTY IS PRESCRIBED FOR BUILDINGS

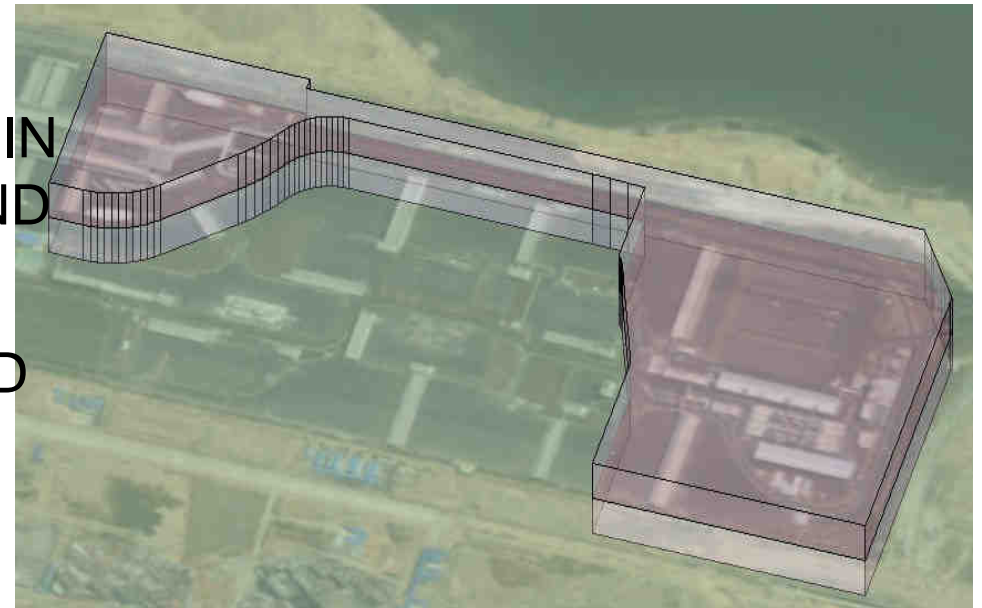
PROPERTY ON THE CADASTRAL MAP AND PRESENTATION OF PARTS (SEPARATE AND COMMON) PER FLOOR



CHINA - SHENZHEN MUNICIPALITY

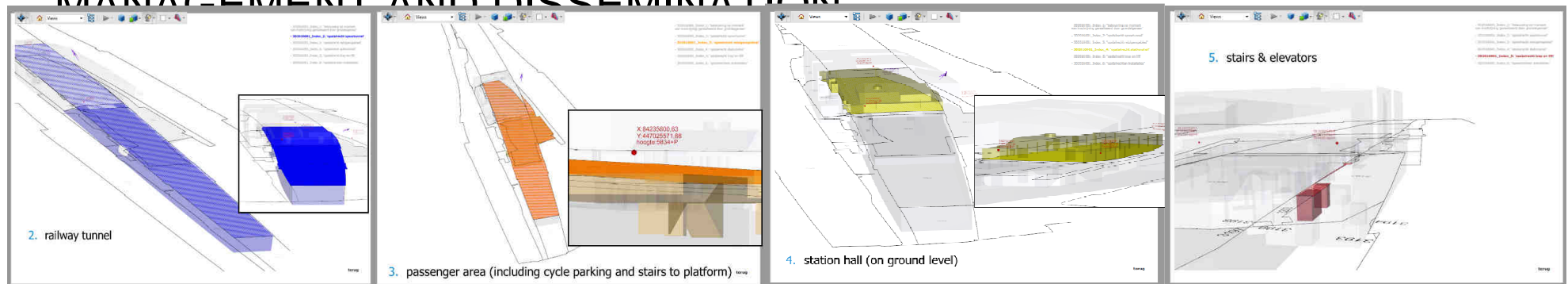
- PUT FORWARD A 3D CADASTRAL MANAGEMENT TO SUPPORT FULL PROCESSES OF 3D LAND/SPACE MANAGEMENT
- REVISED THE LAW (2012)
- HANDLED MORE THAN 800 CASES IN 3D LAND PLANNING, GRANTING AND REGISTERING
- PROMOTE THE APPLICATION OF 3D PLANNING AND 3D CADASTRE

3D SPACE WITH MULTIPLE JURISDICTIONS IN SHENZHEN BAY PORT AREA.



THE NETHERLANDS

- **FIRST PHASE:** EXTENSION OF THE CADASTRAL SYSTEM TO ACCEPT 3D DESCRIPTIONS IN 3D PDF FORMAT AS PART OF THE DEED
- **SECOND PHASE:** RESEARCH IN PROGRESS AND COMPRISES THE ACTUAL INCLUSION OF THE 3D DATA IN THE REGISTRATION, ENABLING COMPLETE VALIDATION AND EVEN BETTER 3D DATA MANAGEMENT AND DISSEMINATION

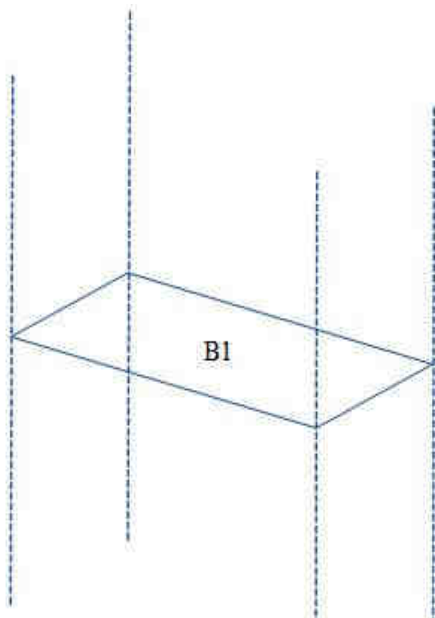


LEGAL VOLUMES DESCRIBED IN THE 3D PDF IN LAND REGISTER

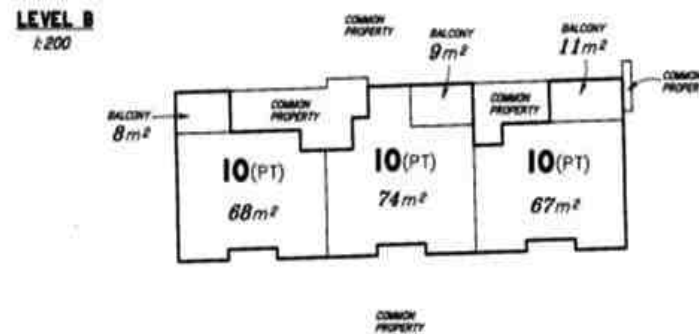
DIVISION OF AND APPROACHES TO 3D SPATIAL UNITS

IN THOMPSON ET AL. 2015

2D SPATIAL UNIT



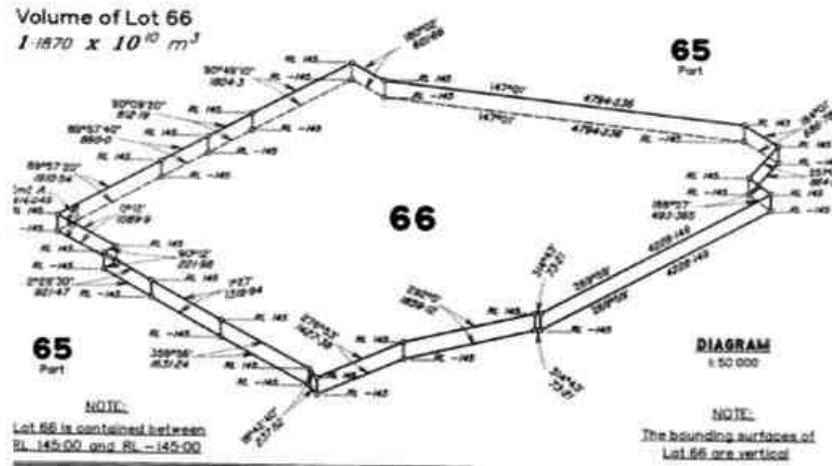
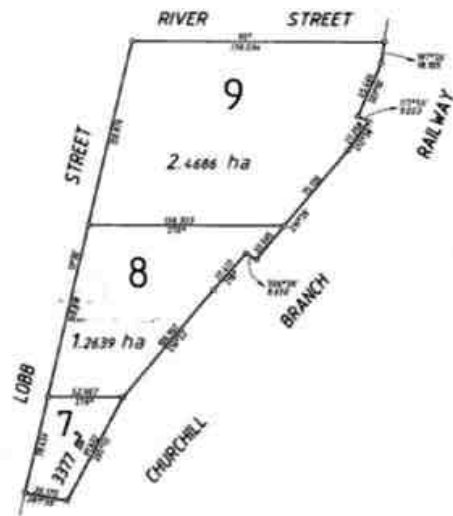
BUILDING FORMAT UNIT



DIVISION OF AND APPROACHES TO 3D SPATIAL UNITS

3D SPATIAL UNIT

ABOVE/BELOW DEPTH OR HEIGHT POLYGONAL
 SECTION

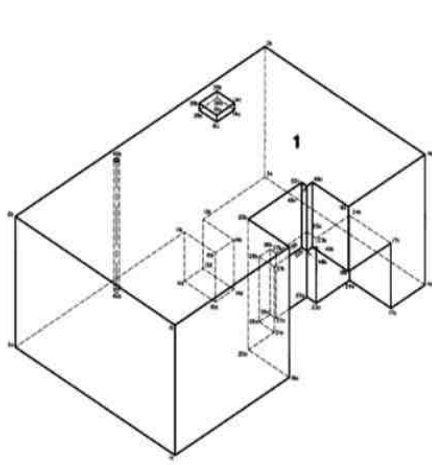


Lot 7 formerly Resub. 1 of Sub. 1 of Par. 140 below the depth of 70ft. from the surface
 Lot 8 formerly Resub. 1 of Sub. 1 of Par. 141 below the depth of 70ft. from the surface
 Lot 9 formerly Sub. 1 of Par. 144 below the depth of 70ft. from the surface

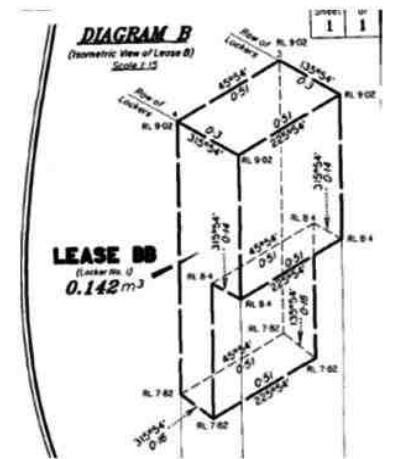
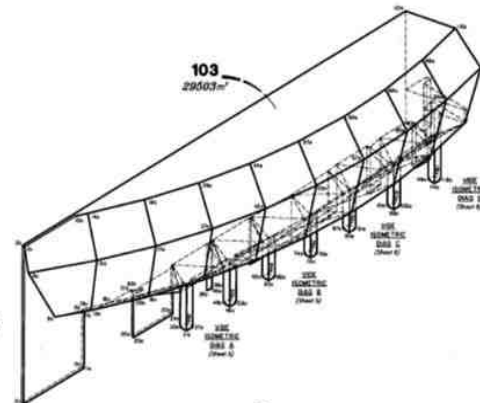
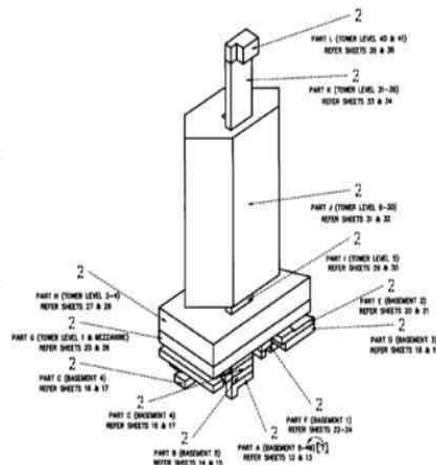
DIVISION OF AND APPROACHES TO 3D SPATIAL UNITS

3D SPATIAL UNIT

SINGLE-VALUED
STEPPED SLICE



MULTI-VALUED
BALANCE SPATIAL UNIT
STEPPED SLICE



CONSTRAINTS (VALIDATION REQUIREMENTS) ON A CADASTRAL DATABASE

- NON-OVERLAPPING 2D SPATIAL UNITS
- COMPLETE NON-OVERLAPPING 2D
- NON-BASE 2D SPATIAL UNITS
- 3D SPATIAL UNITS REPRESENTED AS FOOTPRINTS
- SIMPLE 3D AS EXTRUDED POLYGONS
- NON-OVERLAPPING 3D COVERAGE
- COMPLETE NON-OVERLAPPING IN 3D
- NON-BASE (SECONDARY INTEREST) 3D*

CONCLUSIONS AND FUTURE TRENDS ^{1/2}

- NO COUNTRY HAS A FULLY IMPLEMENTED FUNCTIONAL 3D CADASTRE
- EXAMPLES OF PARTIAL IMPLEMENTATION, BUT WITH LIMITED FUNCTIONALITIES
- PROGRESS IN PROVIDING LEGAL PROVISIONS FOR THE REGISTRATION OF 3D CADASTRE (3D INFORMATION ON CADASTRAL PLANS: ISOMETRIC VIEWS, VERTICAL PROFILES OR TEXTUAL INFORMATION, ..)
- DATA CAPTURE: ONE OF THE COSTLIEST PHASES OF THE IMPLEMENTATION OF 3D CADASTER. NEED FOR LOW COST SOLUTIONS/RAPID DATA ACQUISITION:
 - CREATING A 3D DATABASE FROM EXISTING DATASET
 - EXPLORE OTHER SOURCES OF 3D DATA: 3D TOPOGRAPHICAL DATA, LIDAR DATA, 2D/3D FLOORPLANS, LASER SURVEYS OF INDIVIDUAL BUILDING UNITS, DATA FROM VGI

CONCLUSIONS AND FUTURE TRENDS 2/2

- THE TRUE COST OF SUCH RAPID DATA ACQUISITION HOWEVER COMES WHEN ATTEMPTING TO LINK TO THE EXISTING CADASTRAL FRAMEWORK AND VALIDATING SUCH DATA
- INITIAL IMPLEMENTATION OF 3D CADASTER:
 - WHEN NONE EXISTS PREVIOUSLY, COMPLEX SOLUTIONS MAY NOT BE REQUIRED
 - CLEANING THESE DATASETS TO BE CLOSE TO THE ACCURACY AND FUNCTIONALITY OF THE EXISTING 2D CADASTRE
 - IN REFRESH CYCLES WITH PROGRESSIVE LEVELS OF MATURITY
 - OR
 - A SYSTEMATIC UPGRADE PROCESS CAN BE UNDERTAKEN WITH FOCUS ON AN AREA AT A TIME

The end

**THANK YOU FOR YOUR
ATTENTION**

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