ANCPI
AGENȚIA NAȚIONALĂ DE CADASTRU ȘI PUBLICITATE IMOBILIARĂ

AiS International Summer School
Orvieto-Todi
20-26 August 2023

CNC
CENTRUL NAȚIONAL DE CARTOGRAFIE

USING THE CNC CARTOGRAPHIC DATABASE IN WATER AND LANDSCAPE MANAGEMENT IN THE CONTEXT OF CLIMATE CHANGE

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Todi, Italy, 24 August 2023

WHO ARE WE?

The National Center for Cartography (CNC)

- is a public institution with legal personality subordinated to the **National Agency for Cadastre and Land Registration;**
- is the only authority in the field of cartography in Romania;
- is structured in Cartography and Photogrammetry Department, Geodesy and Research-Development Department, IT&C Department, Economic Department, and Legal, HR & Public Relations Department;
- Has a history of more than 65 years – was founded in 1958 – a period over which it has undergone several changes of name and has constantly enriched its field of activity

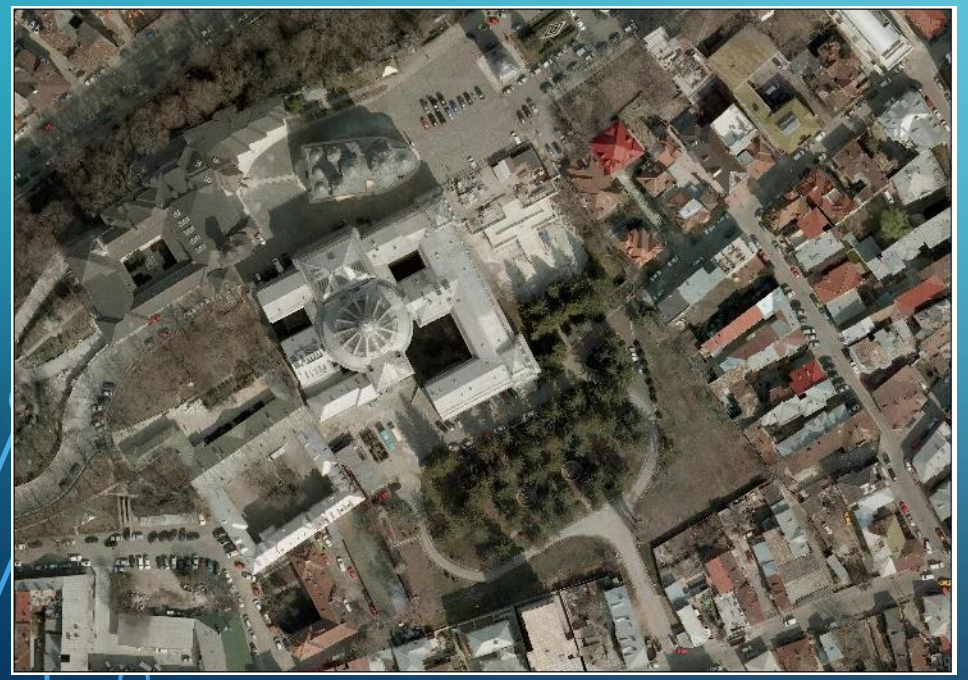
HISTORY

- base map
- do a good job
- basemaps/vector
- GIS program

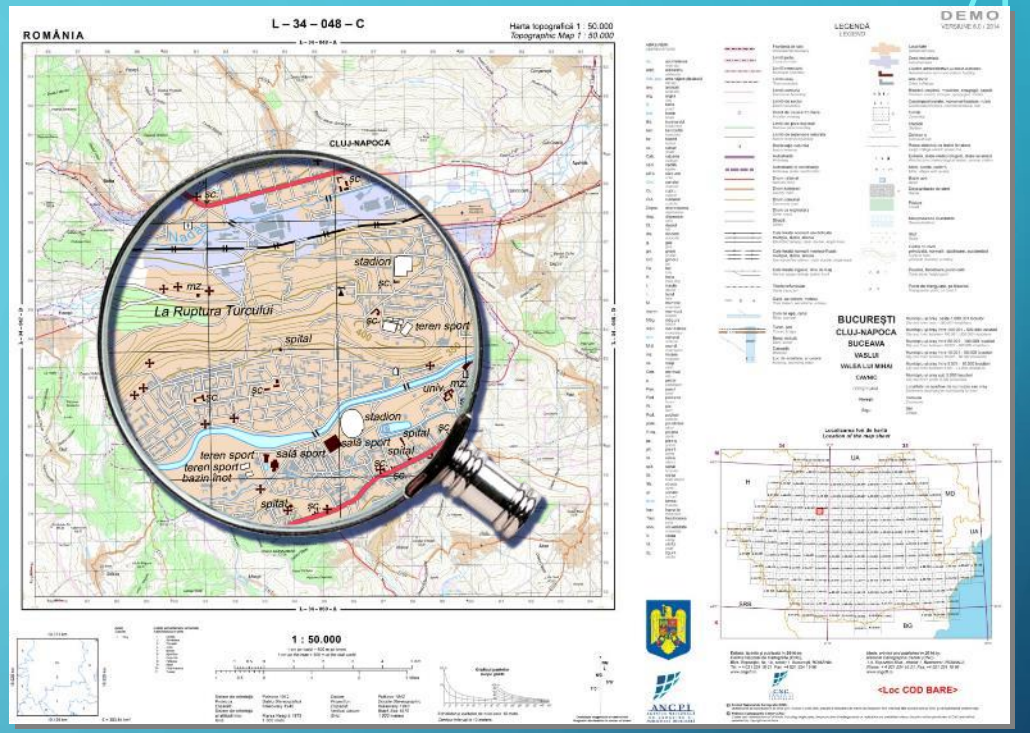
for manage basemaps

- thematic maps focus
- save the world
- LiDAR/raster
- GIS program

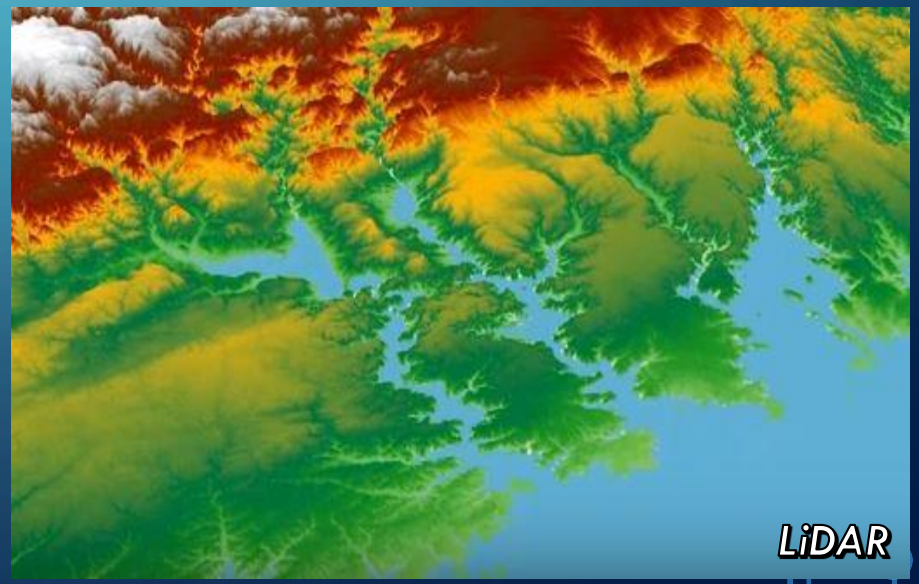
for raster analyses



True Ortophotoplan



The thopographic map of Romania, 1:50.000

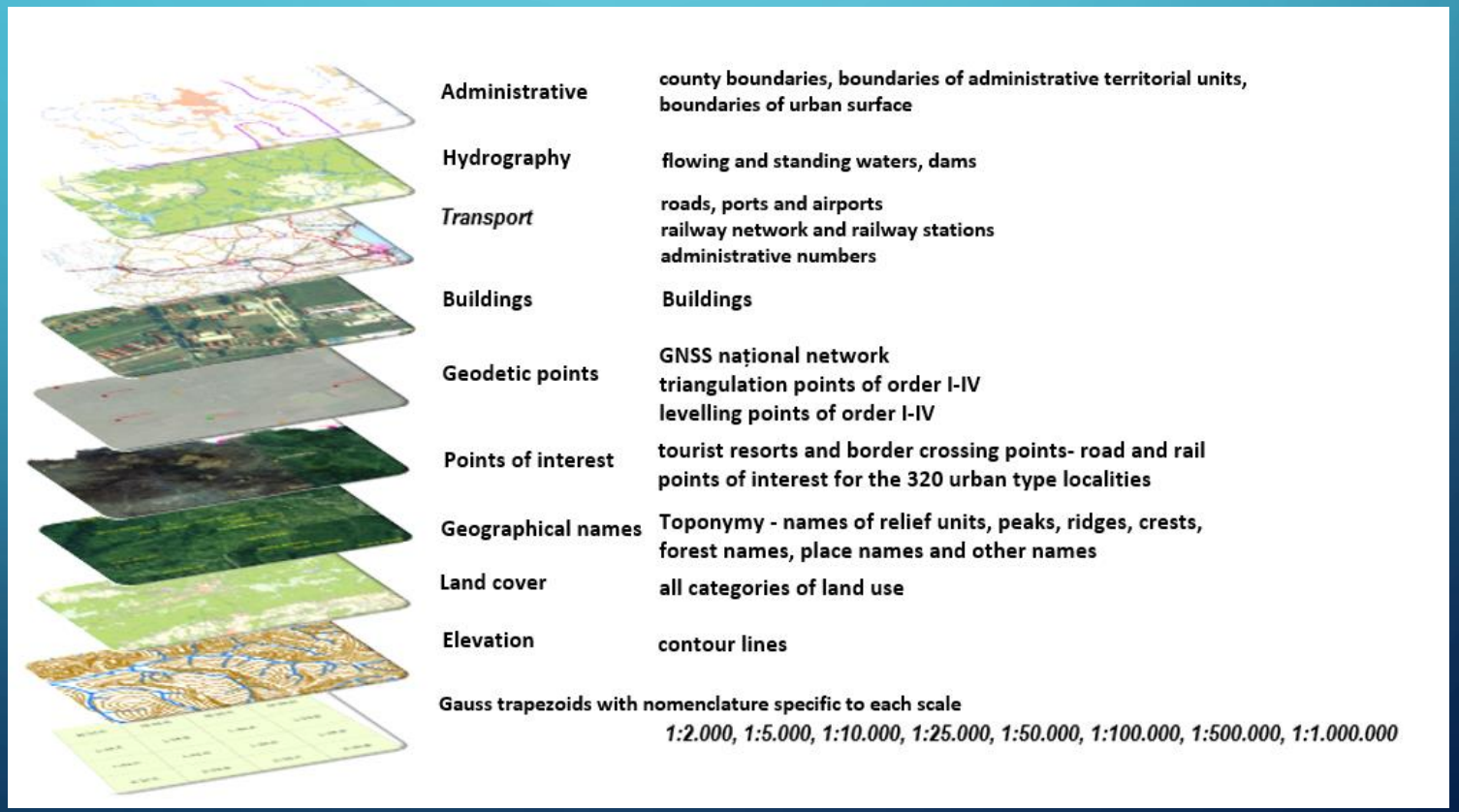


LiDAR

TopRo5

The official map of Romania

- For a long time, we have been organizing cycles for collecting data for the base map, but not for thematic maps
- The Official Map of Romania, called **TopRo5** (Topographic Romania, scale 1:5000), is made by CNC



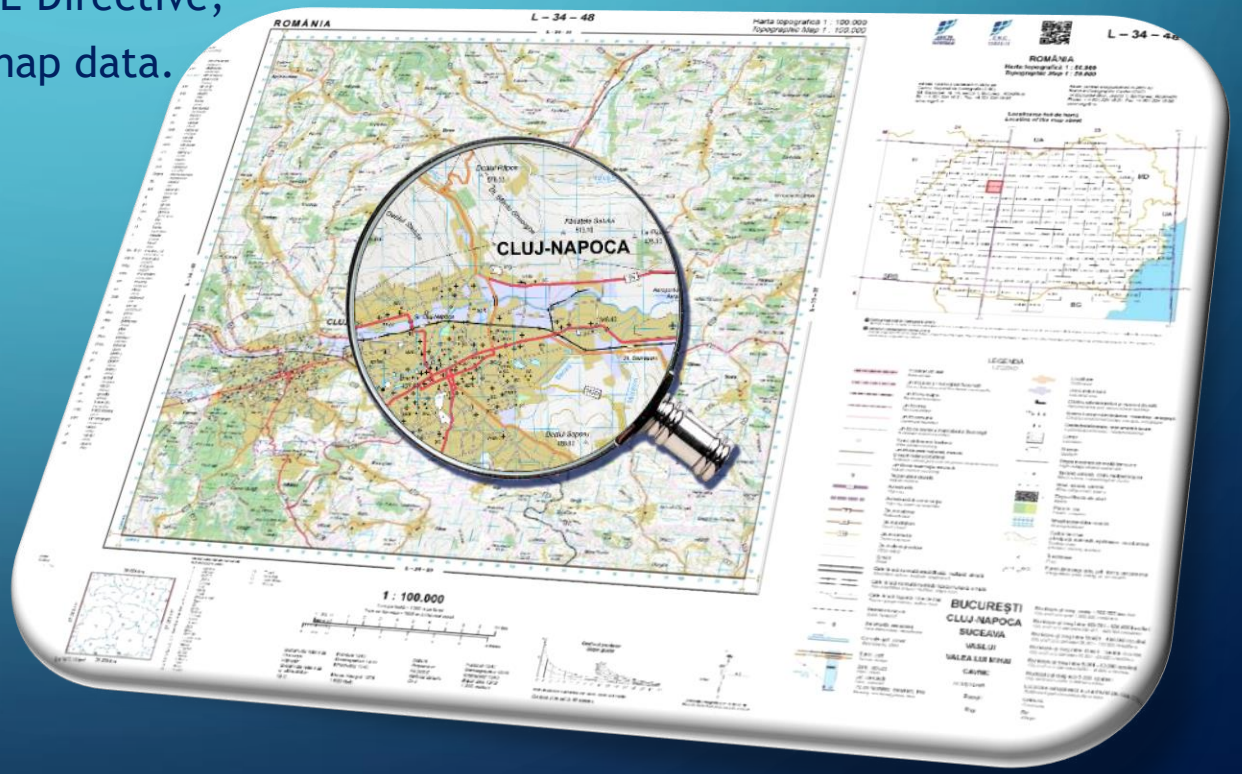
TopRo5

The official map of Romania

TopRo5 represents:

- The digital map, containing graphical and textual information organized in a spatial database;
- the unique cartographic support for the integration of geospatial data for the realization of the National Spatial Information Infrastructure – INIS;
- the decision support for the management activities of central and local public authorities, with application in planning, environment, infrastructure;
- the support for the implementation of the INSPIRE Directive;
- the support for highlighting dynamic changes in map data.

The topographic map of Romania, 1:100.000, 2017 edition



FROM BASEMAP TO THEMATIC MAPS

Climate and environment thematic maps have not been in the spotlight for the last 20 years, but now things are starting to change

- Today, the focus is on the rapid collection and processing of accurate and accessible data for area with large coverage that are essential to support decision-making, especially in risk management

- Romania is a vulnerable area to a series of natural disasters, especially floods, landslides, drought, and extreme weather and this vulnerability will be further exacerbated by climate change

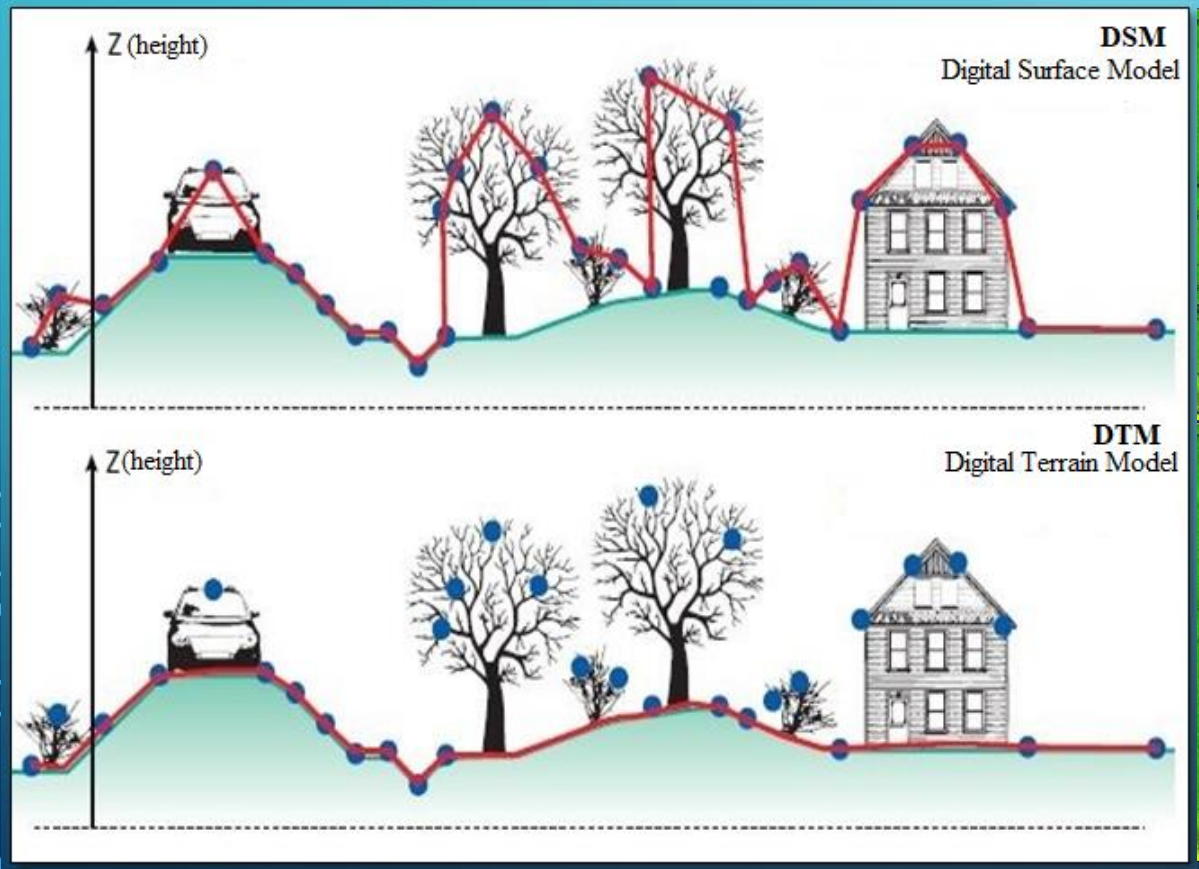
- The CNC has focused in recent years on the implementation of projects aimed at providing "Geographic Information for Environment, Climate Change and EU Integration"

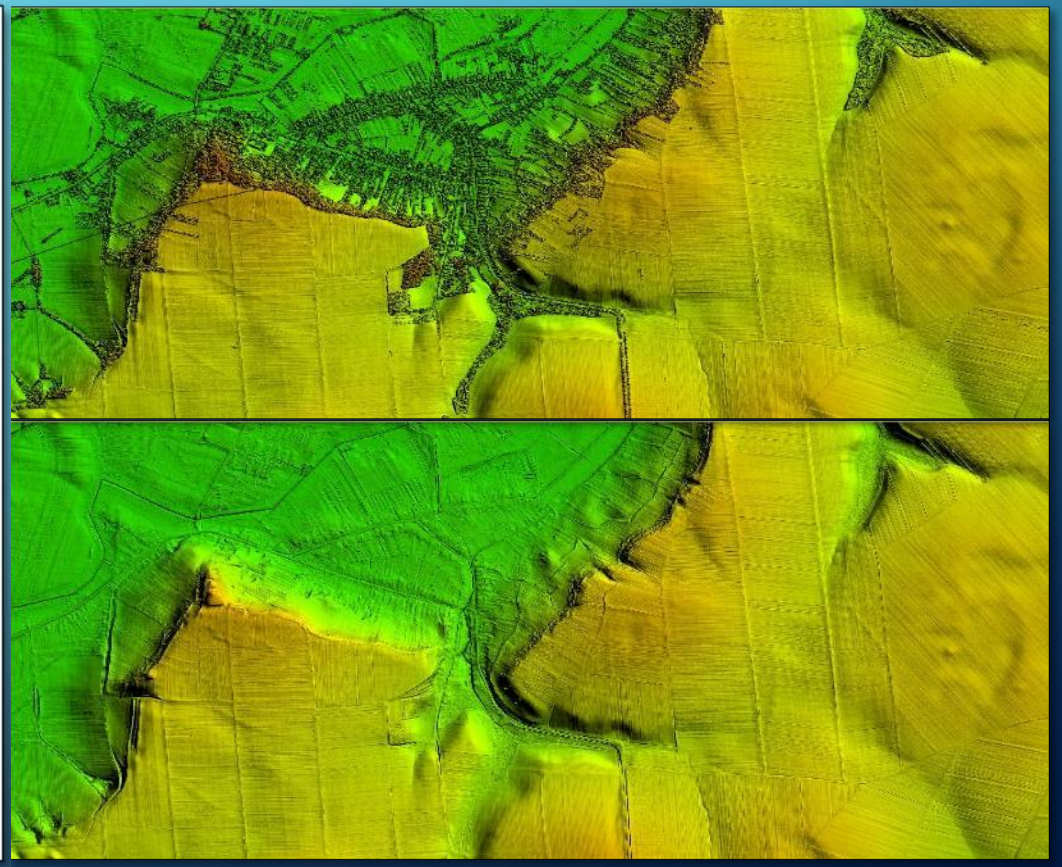
- Some of these projects are: LAKI I, II AND III – "Land Administration Knowledge Improvement"

LIDAR PRODUCTS OF LAKI I, II AND III PROJECT

The specific objectives:

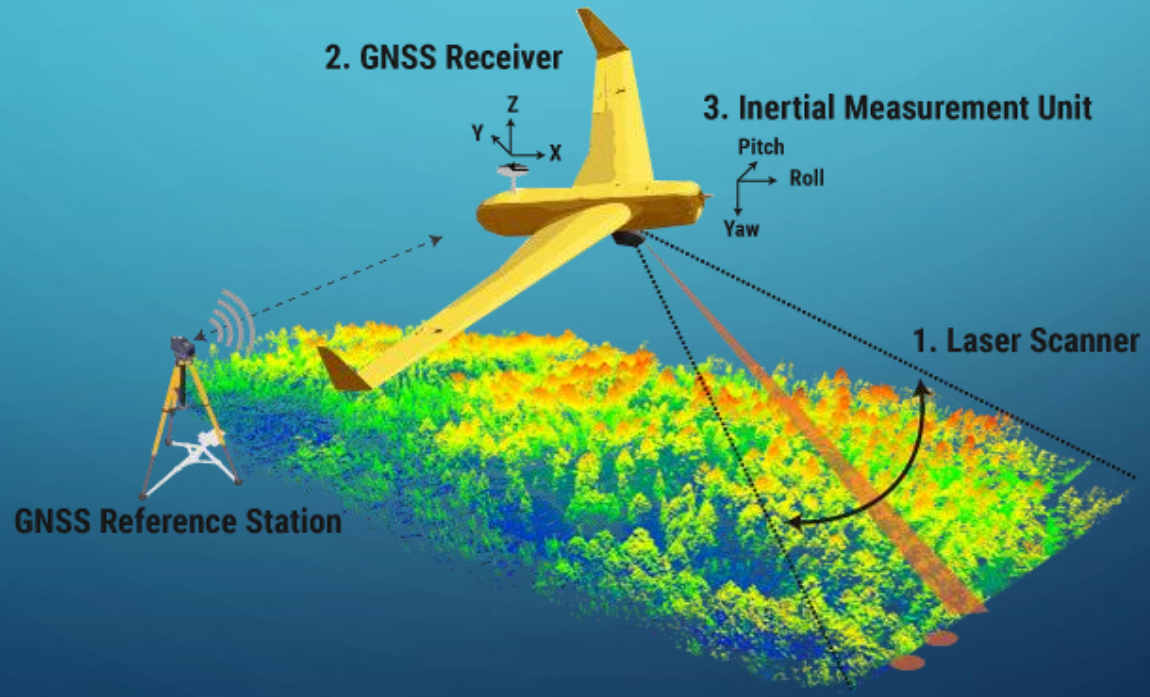
- obtaining high-precision DTM and DSM for areas at high risk of flooding
- obtaining DTM and DSM with adequate precision for rest of the areas
- the achievement of ortophotoplans with a ground resolution of 0.2 meters and corresponding precision
- creating of the digital map and its database



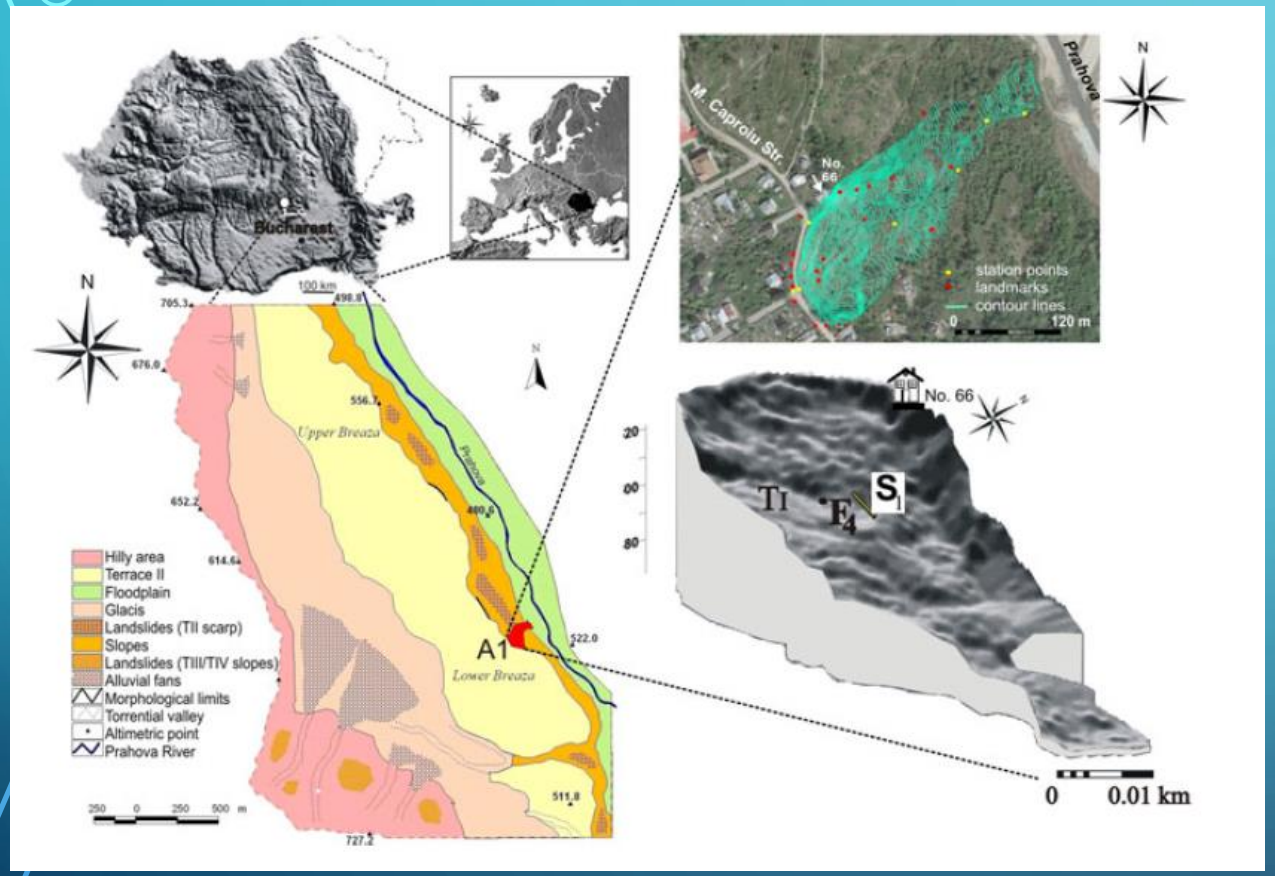


LIDAR APPLICATIONS

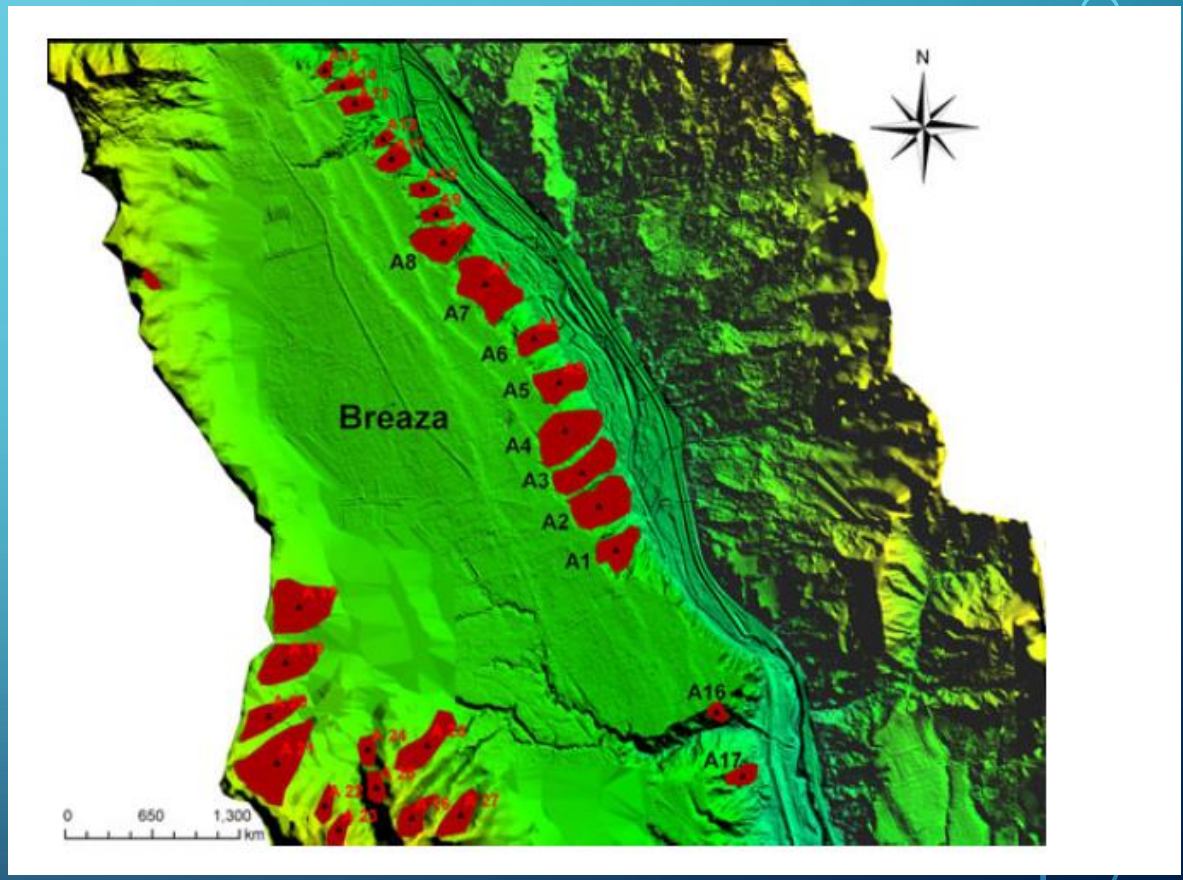
- Flood risk analysis
- Flood simulation
- Analysis of erosion and deposition potential of river channels by hydraulic modelling
- Use of LiDAR data to create susceptibility maps of landslides



USE OF LIDAR DATA
TO CREATE SUSCEPTIBILITY MAPS OF LANDSLIDES

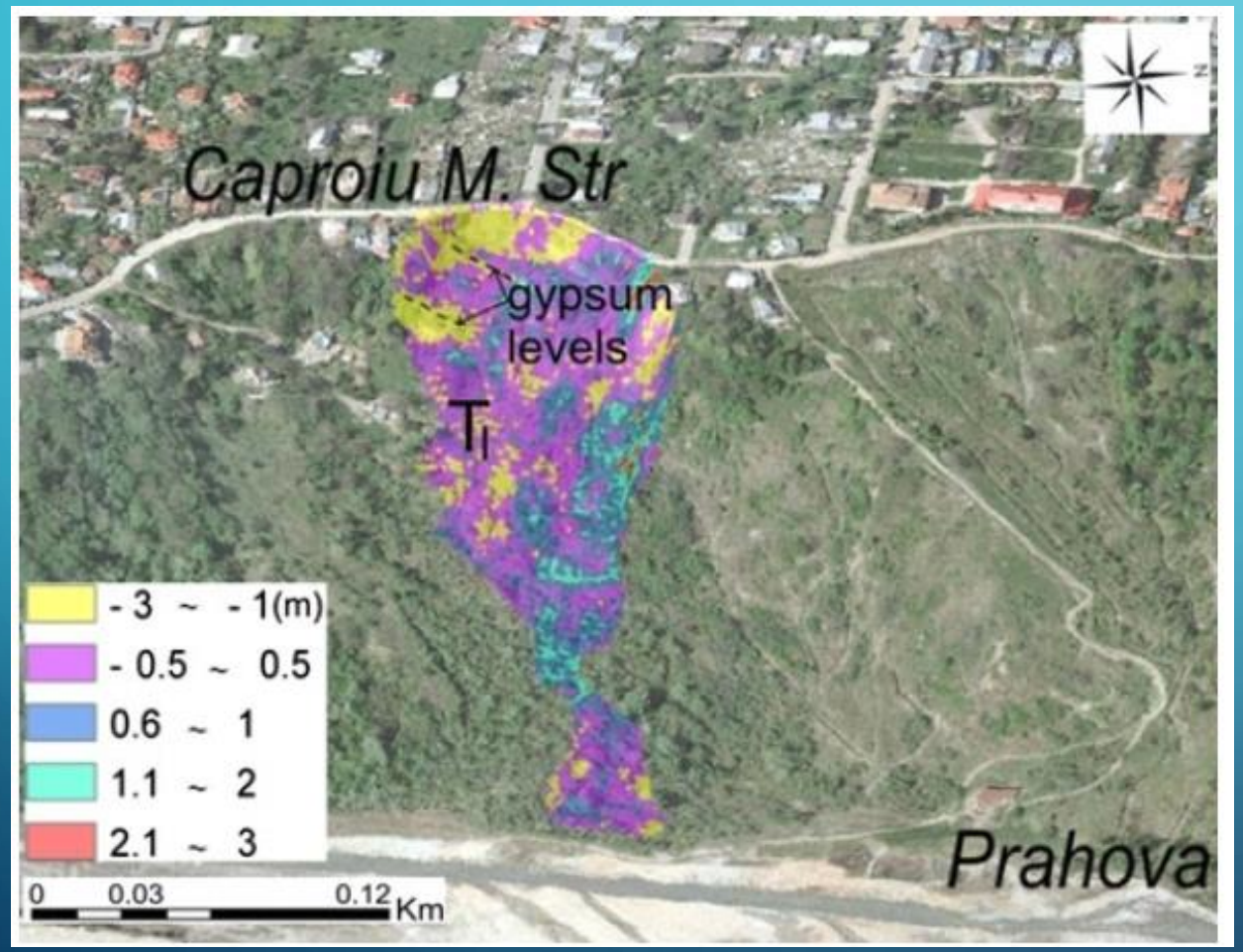


Study area and active landslide A1 location



Location of landslides in the Breaza terrace superposed on LiDAR-DTM

USE OF LIDAR DATA
TO CREATE SUSCEPTIBILITY MAPS OF LANDSLIDES

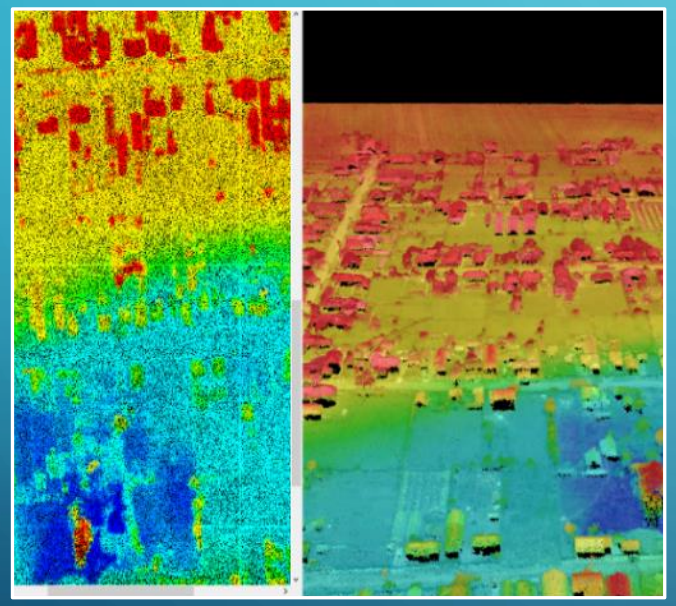


3D result of DTMs subtraction for A1 landslide

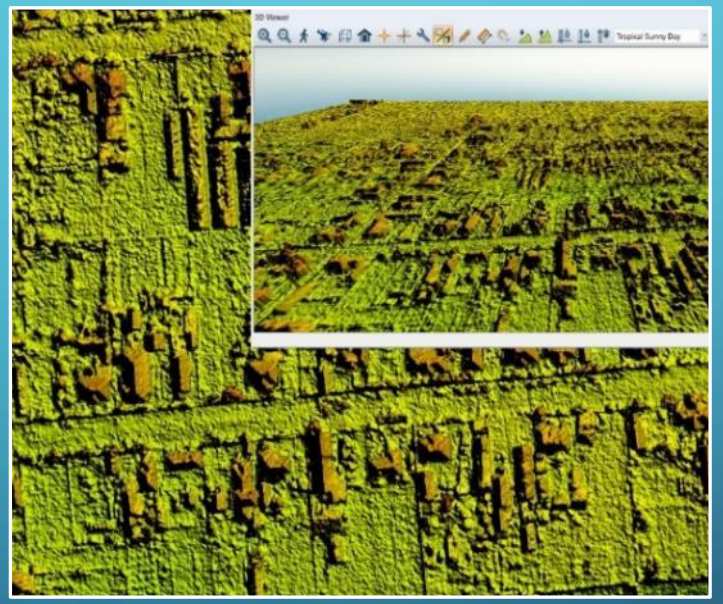
PRODUCING TRUE ORTOPHOTOPLANS FOR 320 ADMINISTRATIVE-TERRITORIAL UNITS FROM URBAN AREA

The products of project are:

Dense Point Cloud



Digital Surface Model

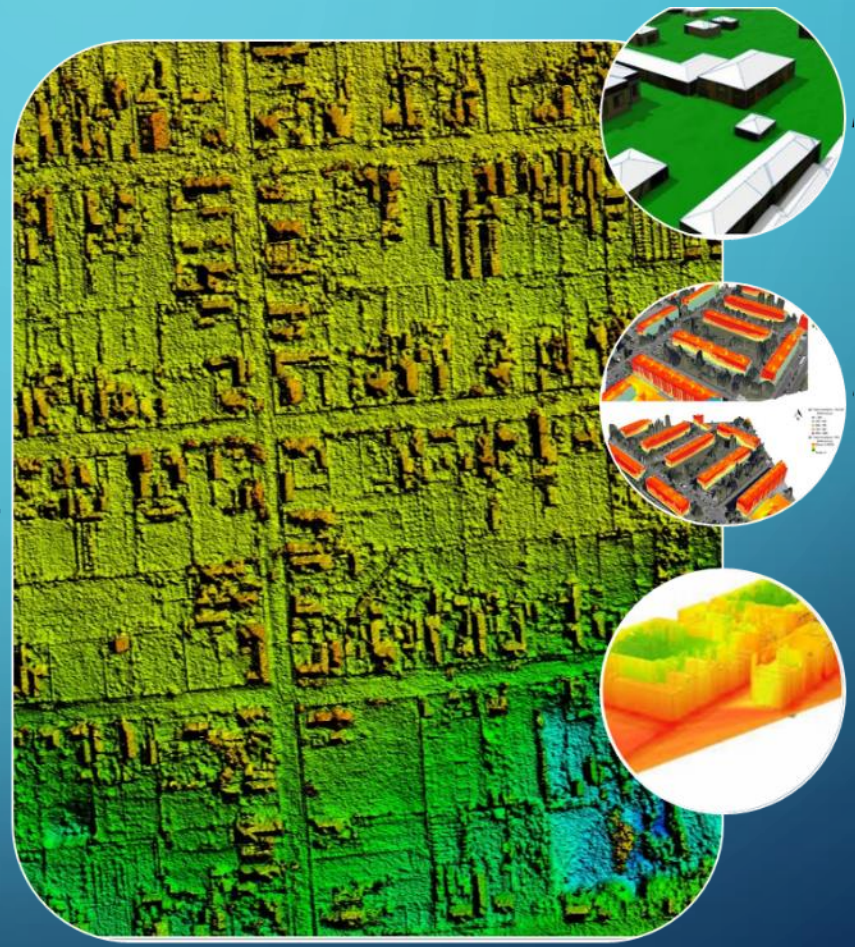


True Ortophotoplan

DIGITAL SURFACE MODELS FOR SMART CITIES

❖These products can be uses for:

- 3D modeling of buildings;
- estimating the effect of solar radiation on buildings;
- estimation of urban area with potential flood damage;
- urban visibility analysis;
- estimation of noise propagation.



3D modeling of buildings

Energy potențial assessment

Simulation of noise propagation

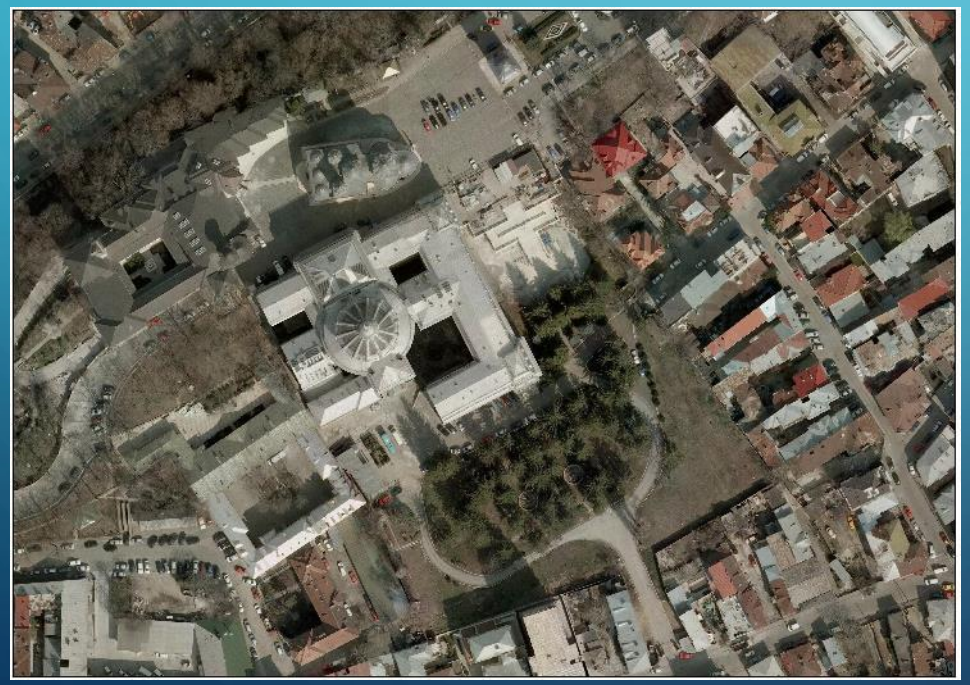
ORTHOPHOTOPLANS AND TRUE ORTHOPHOTOPLANS FOR CITIES

➢These products represent the support of:

- carrying out systematic registration work;

- checking the quality of cadastral documents drawn up for the registration of properties in the framework of sporadic registration;

- drawing up general urban development plans (PUG) and drawing up town planning documents.



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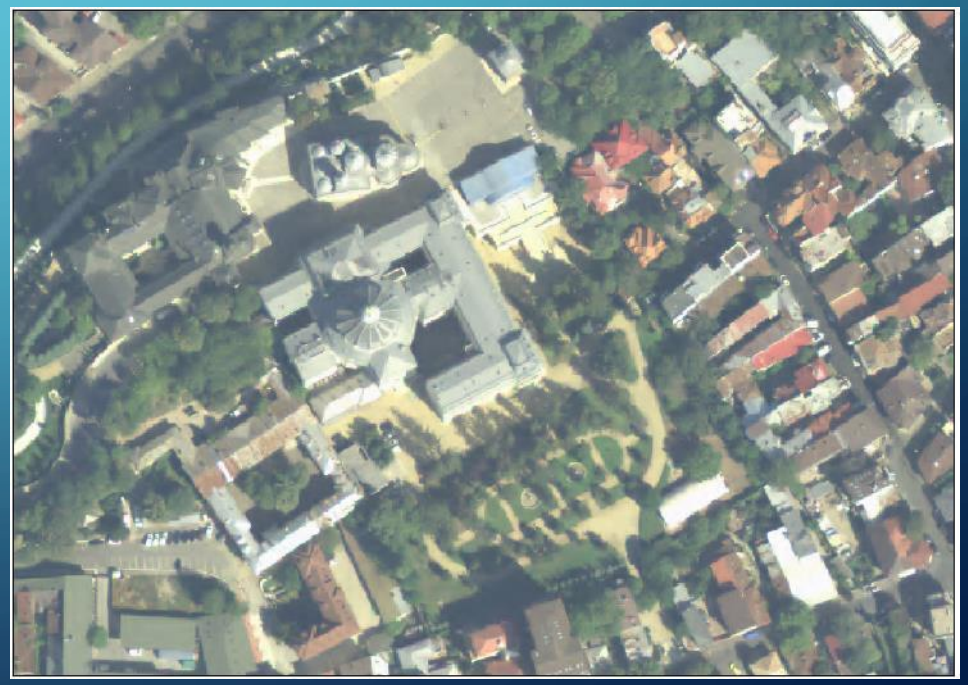
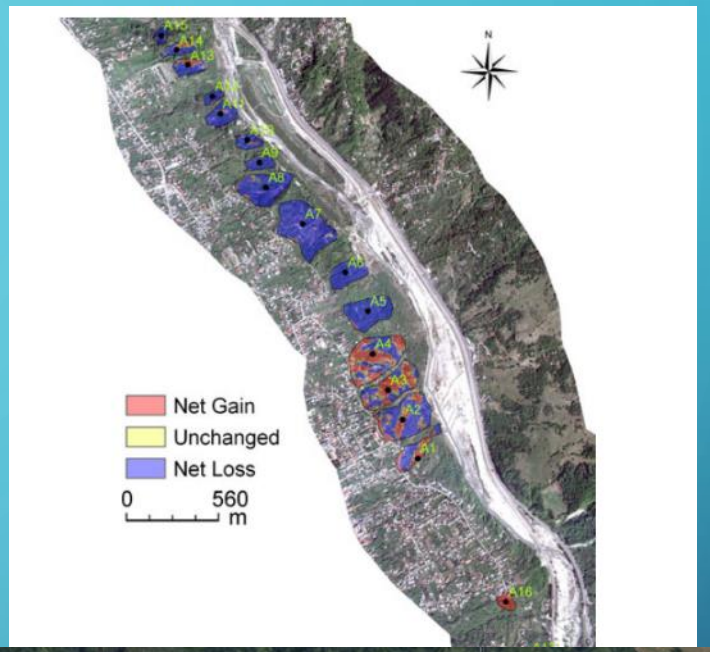


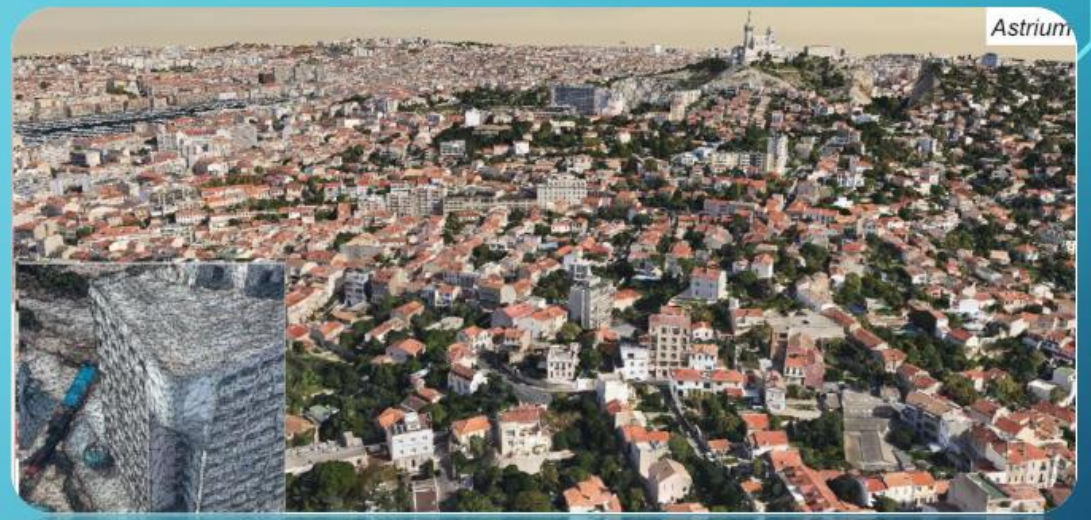
Ortophotoplan

USE OF ORTHOPHOTOPLANS FOR LANDSLIDES MAPPING



3D MESH FOR 3D CADASTRE IN BUCHAREST CITY

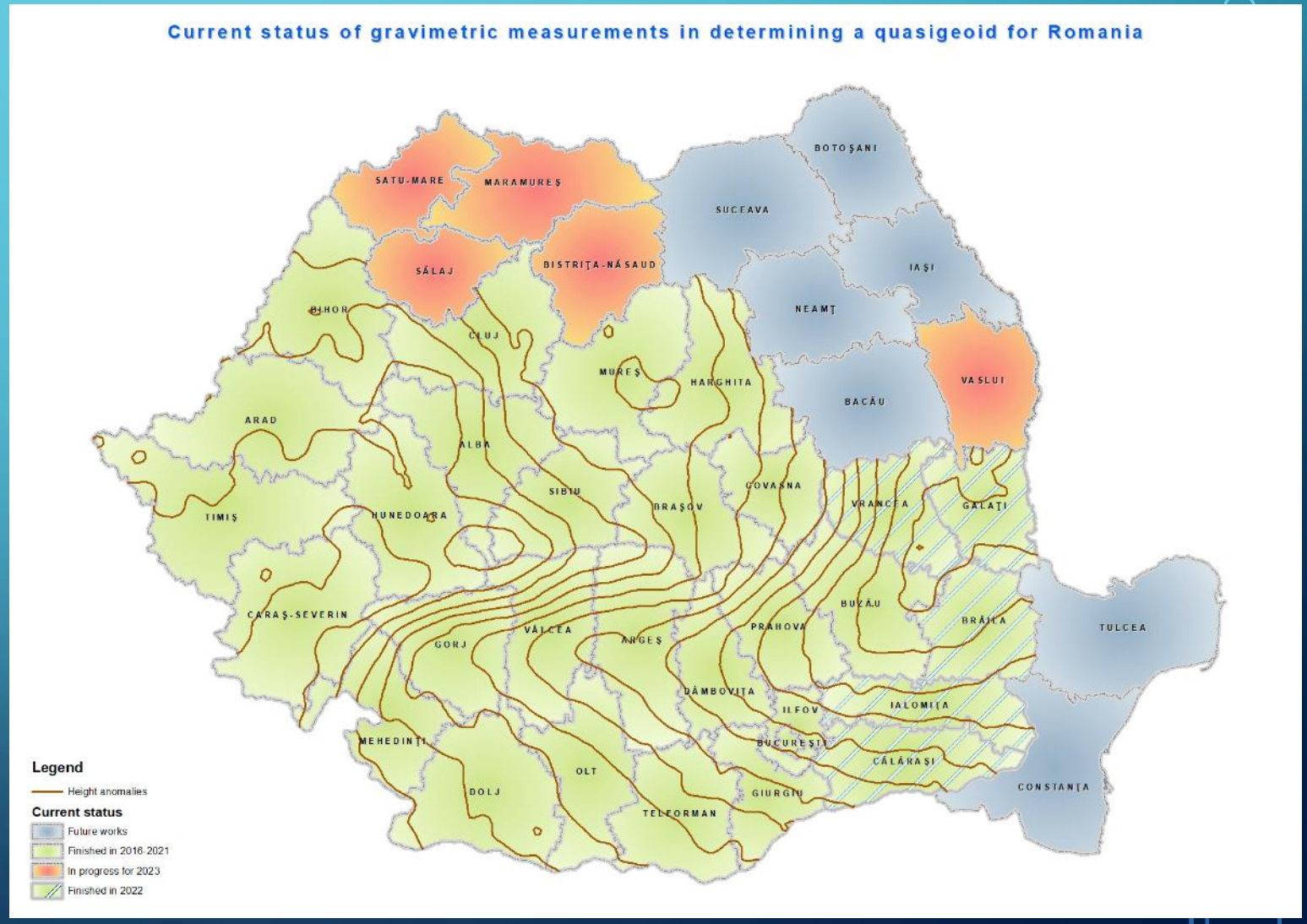
- This product can have the following uses:
- simple visualisation of the built environment;
- inspection of buildings in the model and; usage of the information in the 3D Cadastre;
- height measurements of buildings ;
- damage assessment in case of disasters (earthquake, flood, etc);



DETERMINATION OF A NEW GRAVIMETRIC QUASIGEOID FOR ROMANIA

The project aims to improve the transformation grid on altitudes and to improve the digital elevation model and orthophotomap through which the Romania's topographical reference plan (TOPRO 5) is updated - support for the implementation of the National Programme for Cadaster and Land Book.

This project has been implemented for 30 counties so far.



CONCLUSIONS

- The data and cartographic products obtained within these projects constitutes the reference basis for the various thematic spatial data infrastructures
- The data is useful for the development and implementation of effective and sustainable spatial planning tools that are able to cop with environmental issues, risk assessment, land use monitoring, emergency response and security against climate change, droughts and desertification, as well as for the biodiversity conservation, water resources, forest management, pollution control etc.

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Thank you !

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