

SAR-GRAV underground laboratory (Sardinia): engineering challenges and key solutions

M. Marsella⁷

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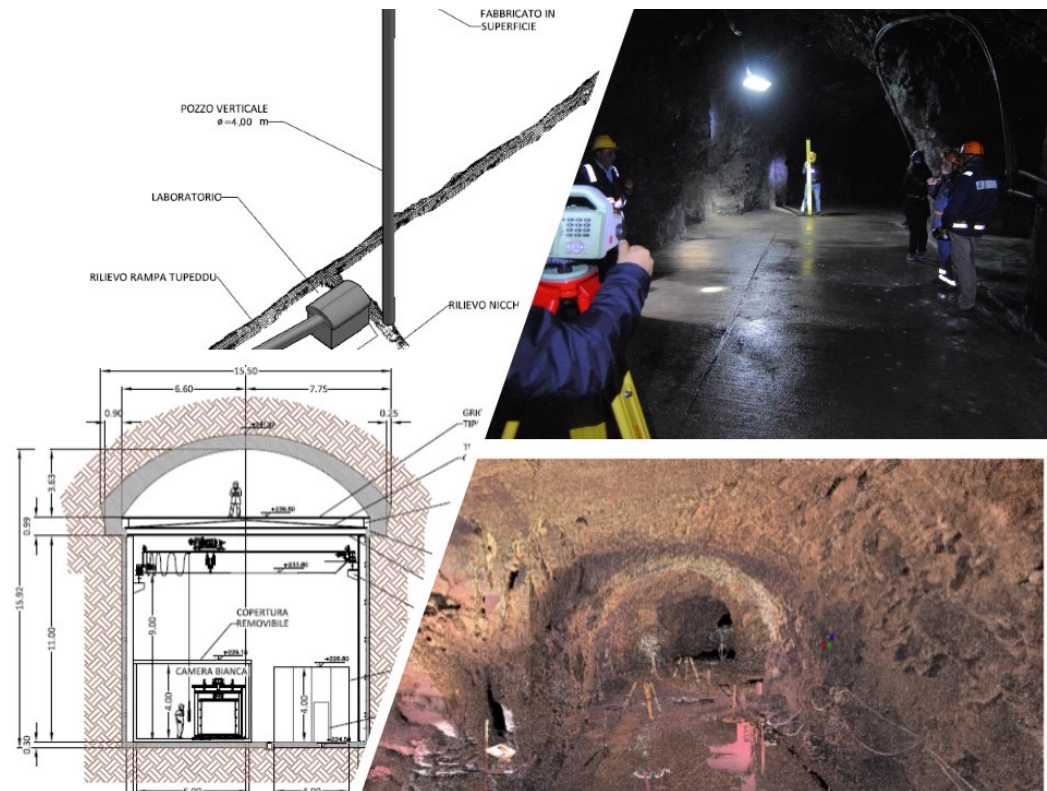
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⁹IGEA spa, Italy

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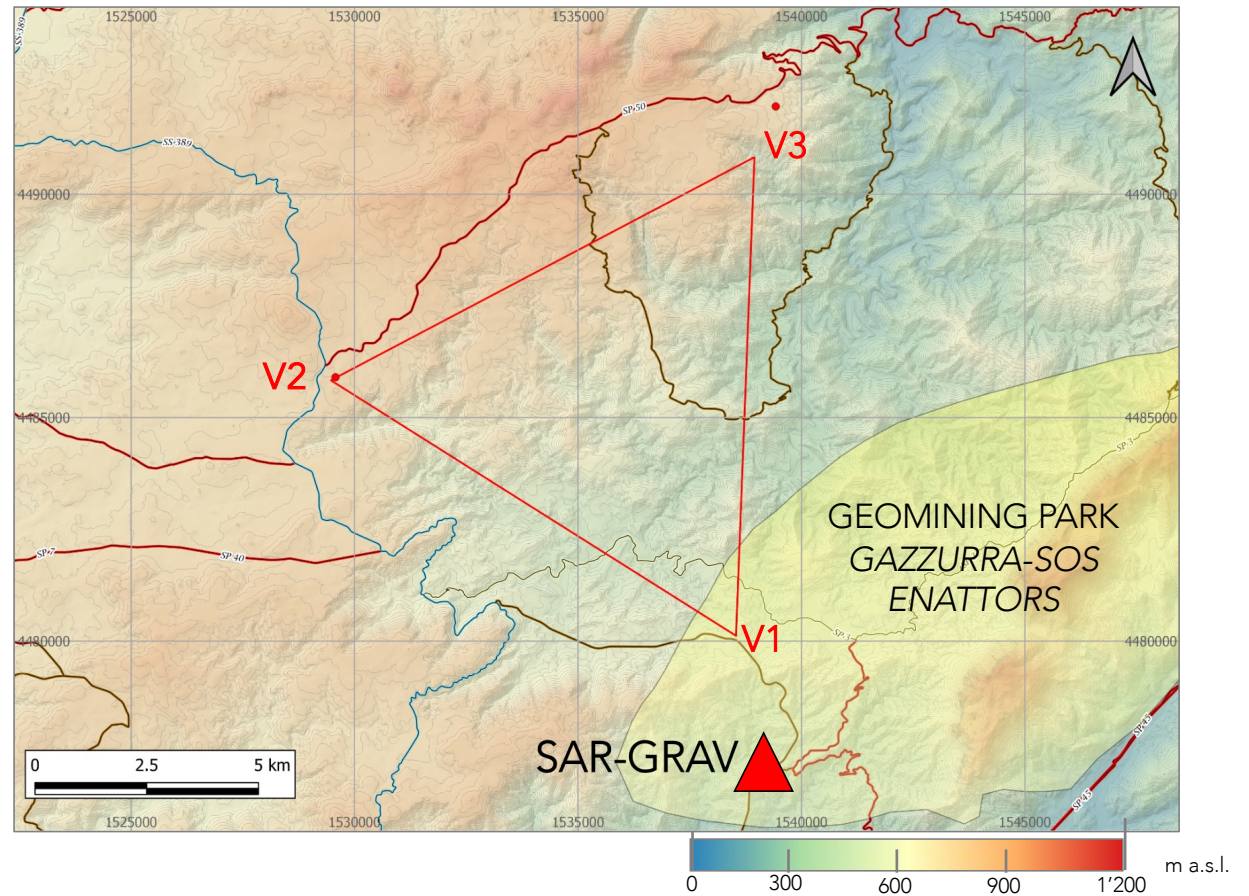
¹¹INFN Sezione di Firenze, Italy



GWADW2021 Gravitational Wave Advanced Detector Workshop 17-21 May2021

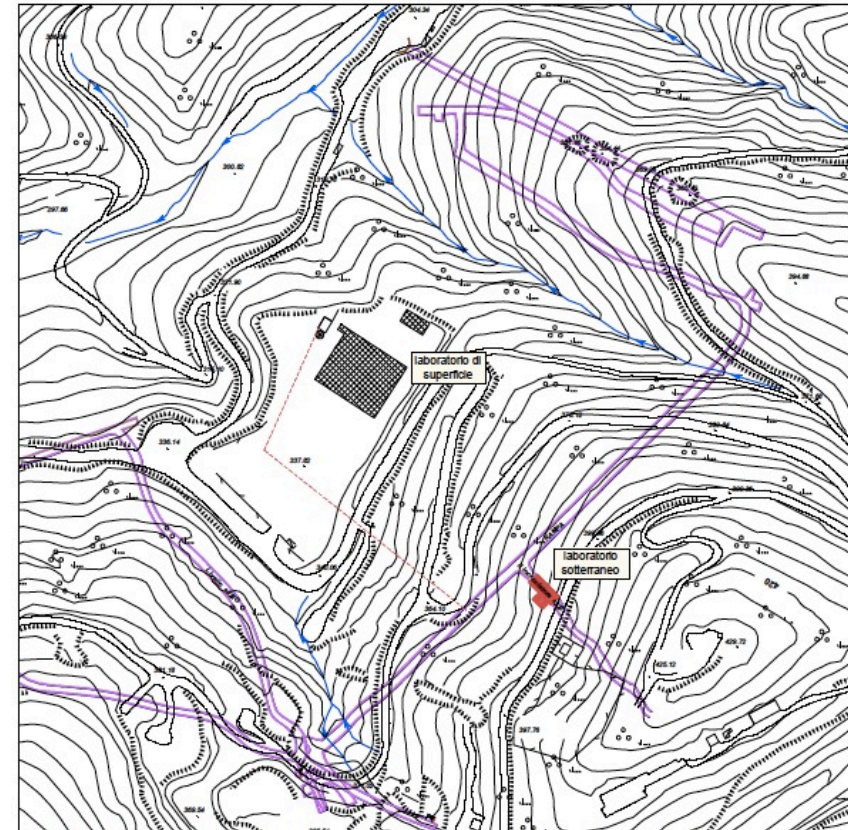
ET-SAR GRAV LOCATION

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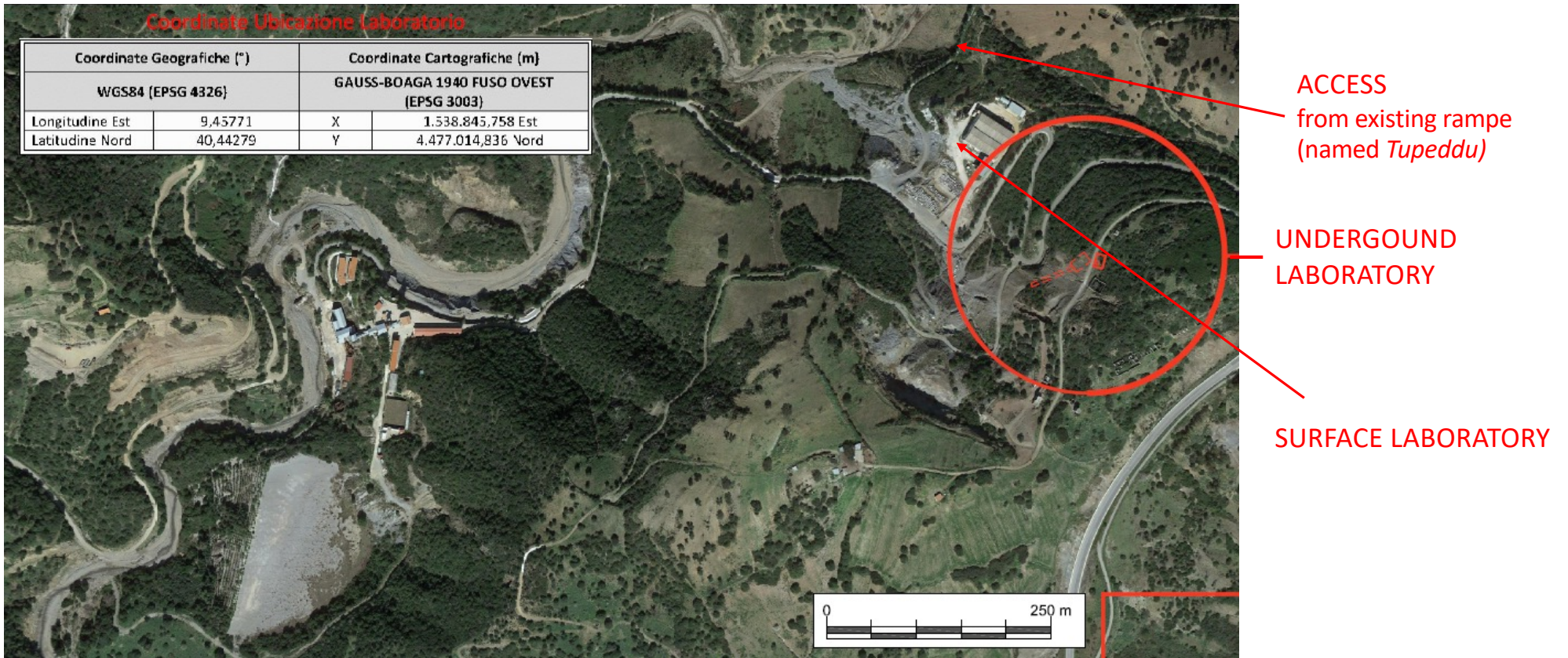
- ❑ SOS Enattos area is a potential vertex ET in Sardinia
- ❑ Hosting site for the SAR-GRAV experiments **starting from Archimedes**
- ❑ Surface lab – control room
- ❑ Underground labs for cryostat lab and subsidiary ones to control seismic and environmental noises

- ✓ GW physicists (INFN)
- ✓ Geologists (UniSS)
- ✓ Engineers with expertise in infrastructure for interferometers (EGO)
- ✓ Engineers with expertise in civil and underground infrastructure (SAPIENZA)
- ✓ Engineers and technicians from the Sardinian mining company IGEA



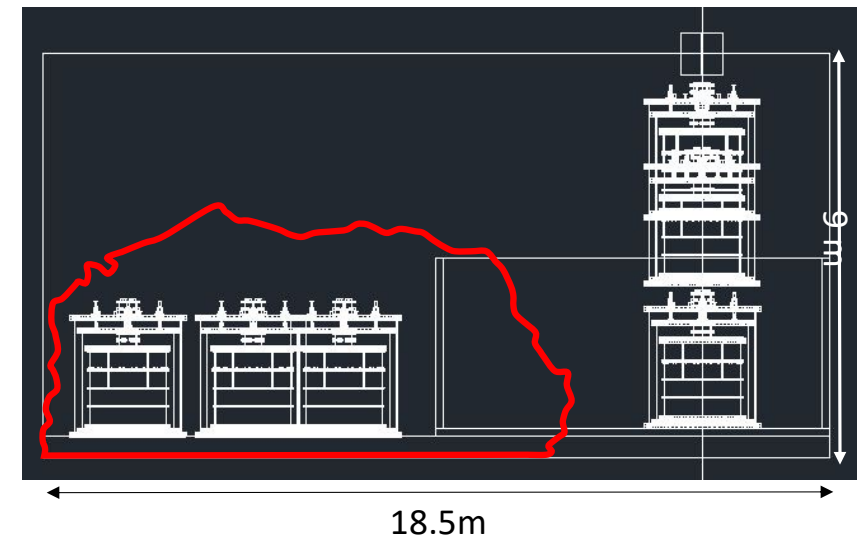
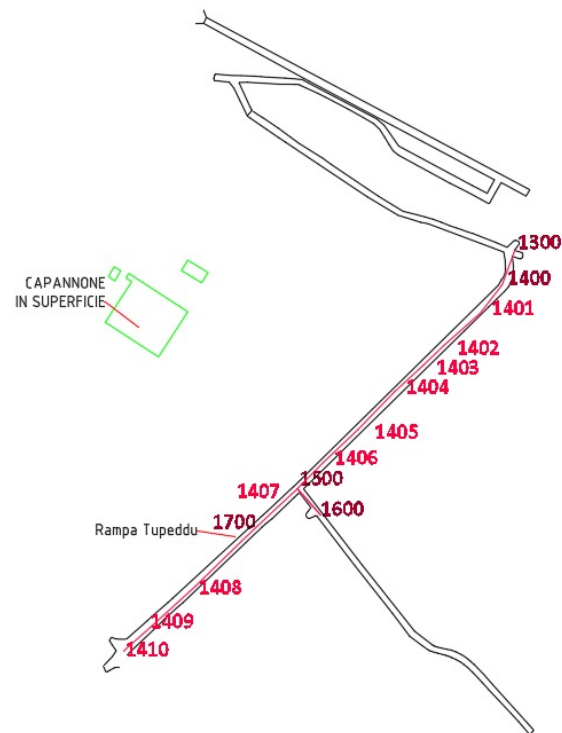
ET-SAR GRAV LOCATION

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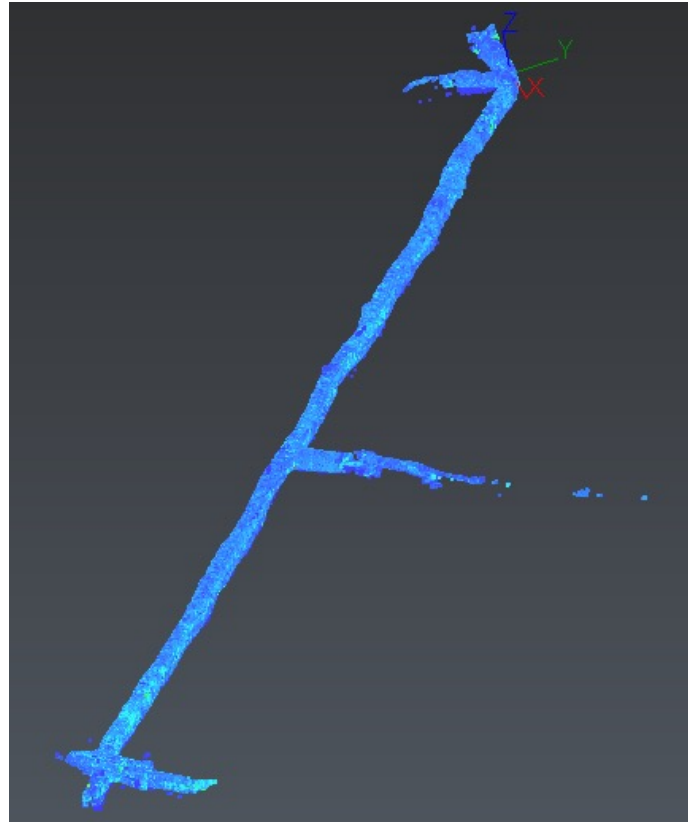
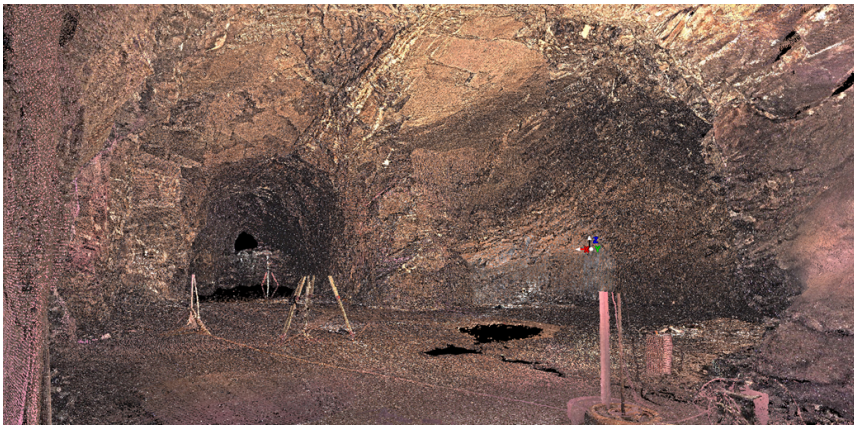
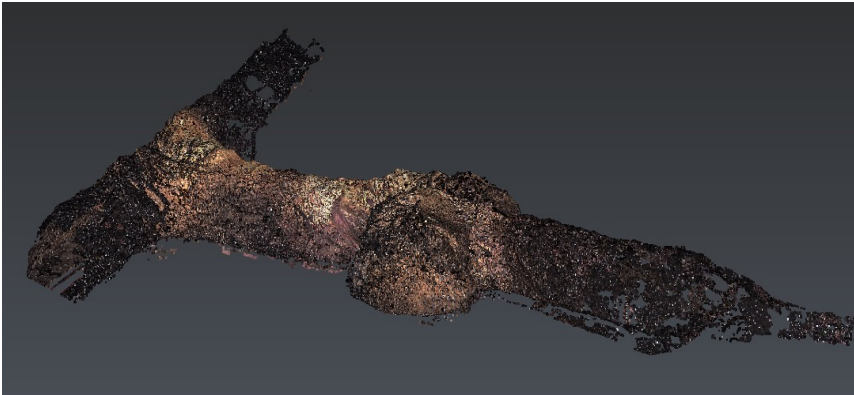


surveying and mapping (2019)

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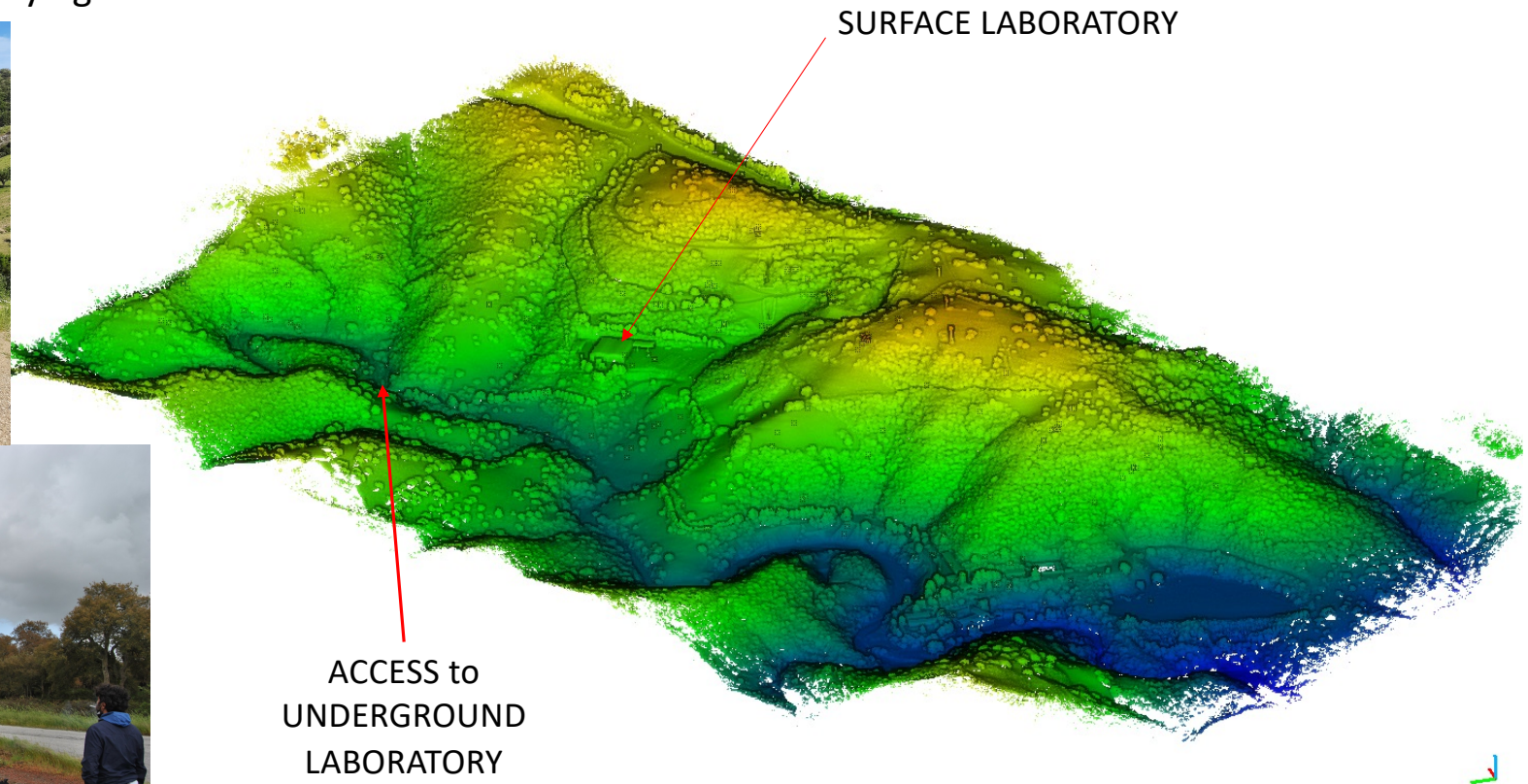
LASER SCANNING



3D surveying and mapping (May 2021)

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UAV – Laser scanning surveying

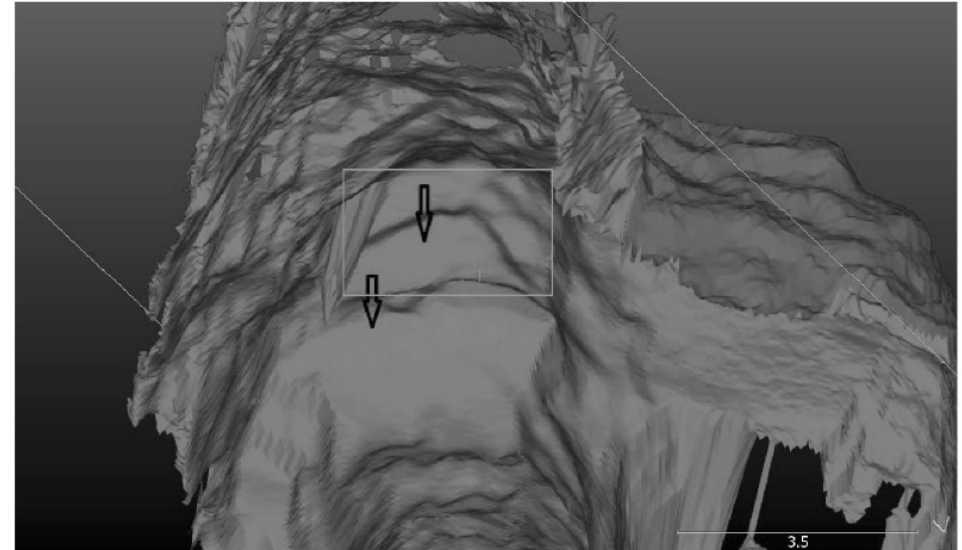
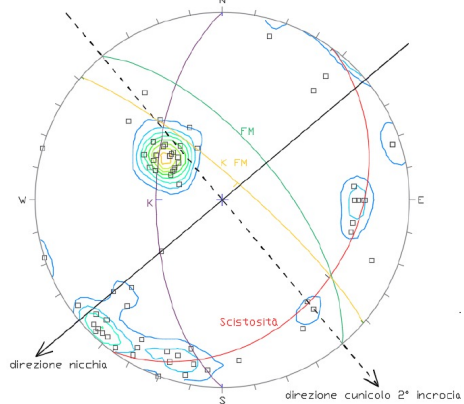
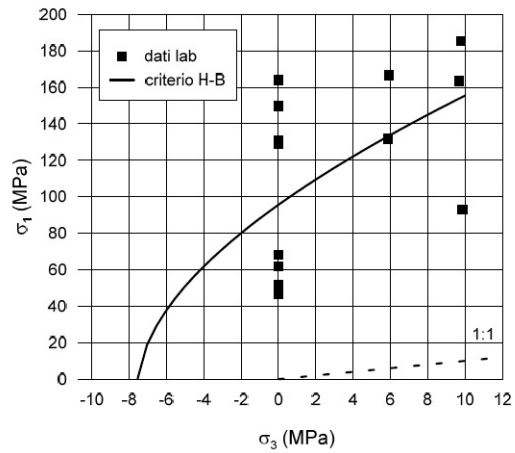


LASER SCANNING



ROCK MASS CHARACTERIZATION

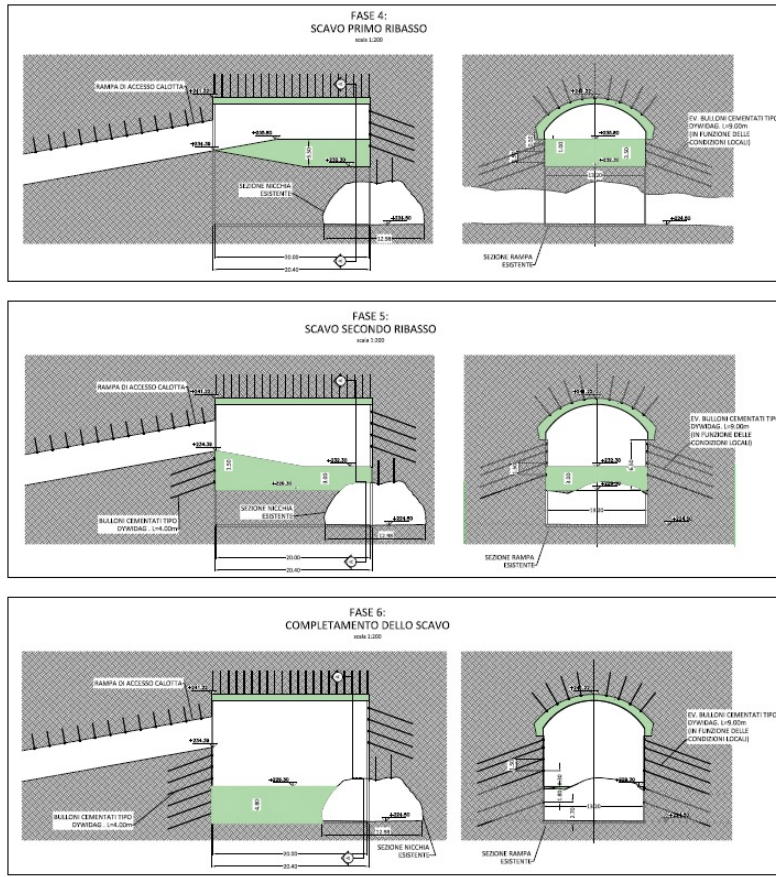
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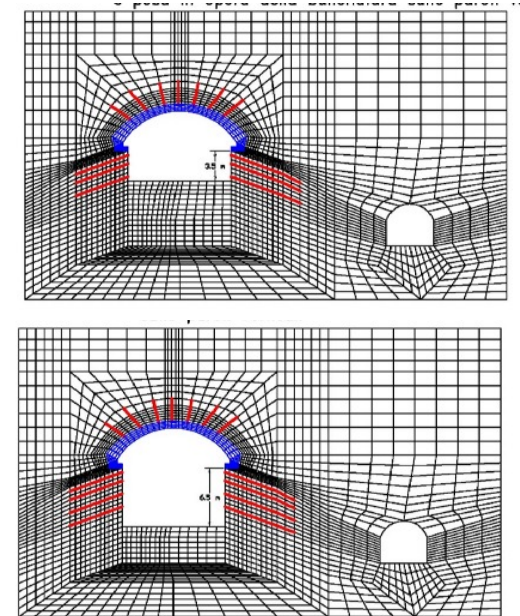
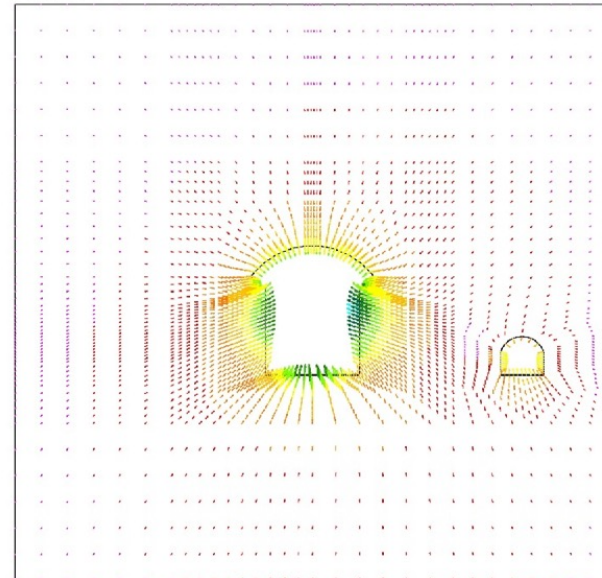
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GEOTECHNICAL MODELLING AND EXCAVATION DESIGN

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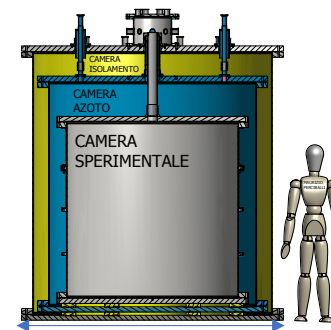
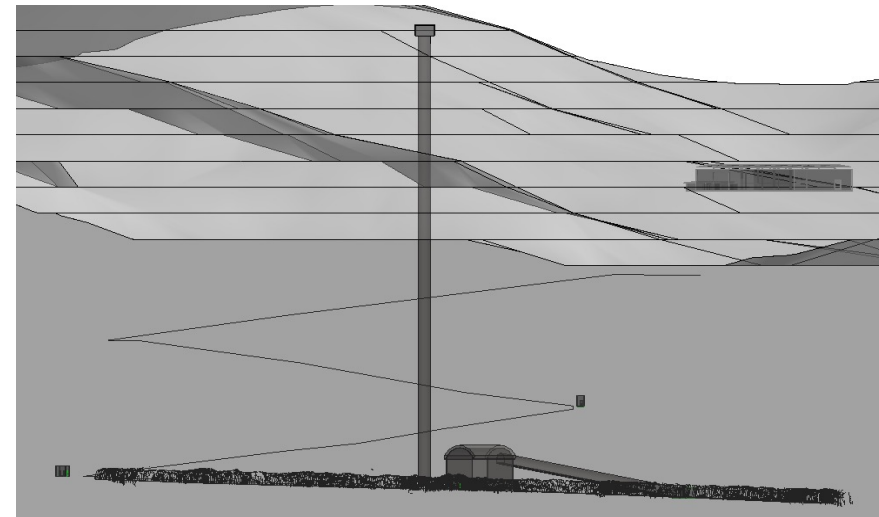
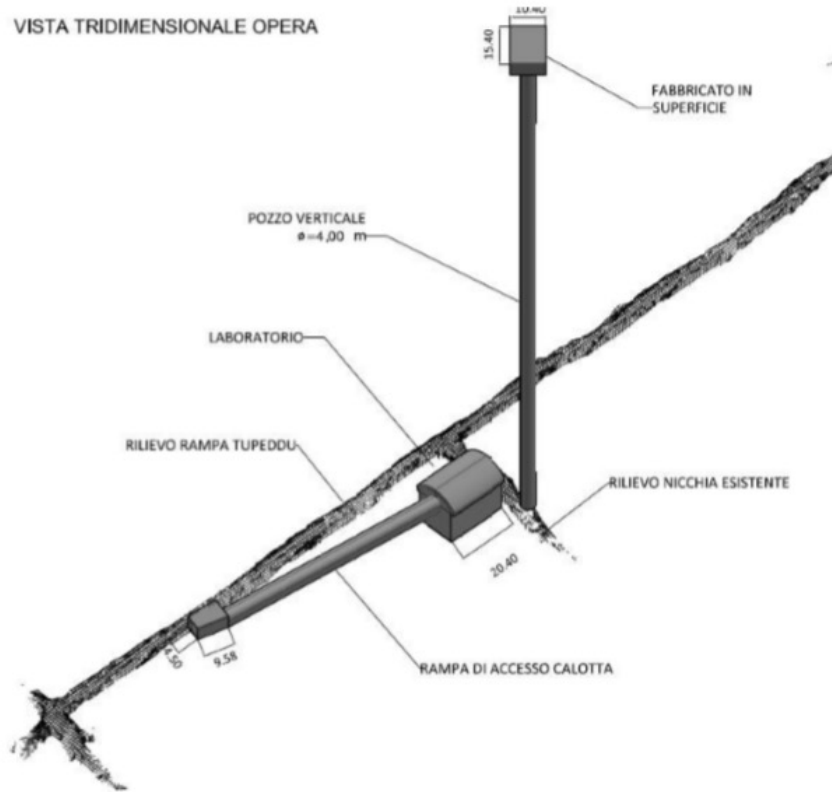
Fase 4



Prof. T. Rotonda, Ing. C. Bardani, Ing. A. Di Giulio – DISG Sapienza

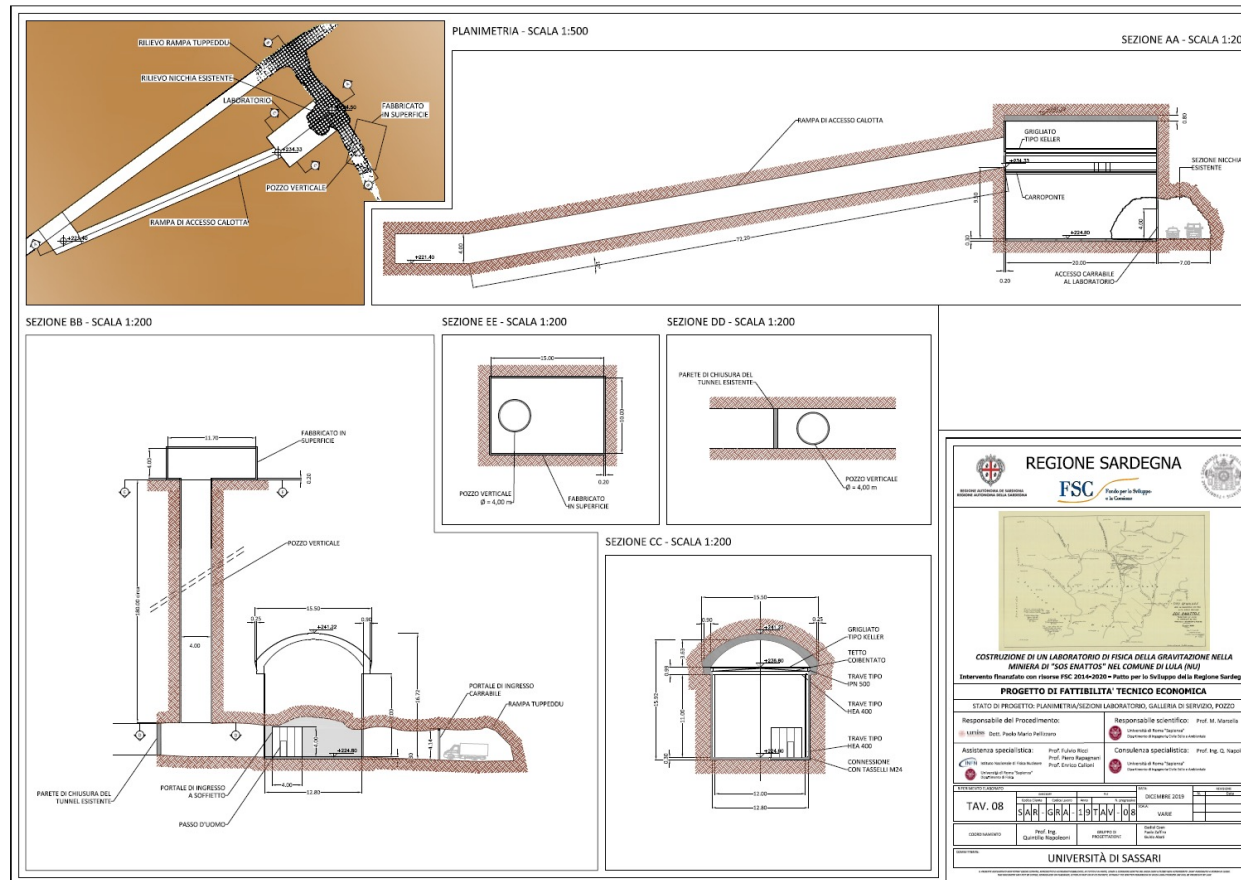
UNDERGROUND LABORATORY

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UNDERGROUND LABORATORY – DESIGN PLAN

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 DIPARTIMENTO DI INGEGNERIA
CIVILE EDILE E AMBIENTALE

 INFN
Istituto Nazionale di Fisica Nucleare

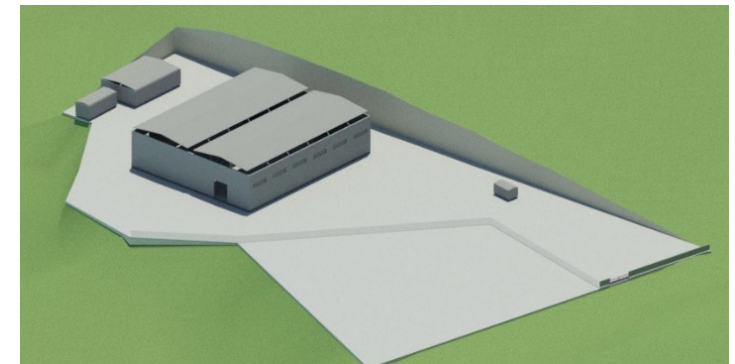
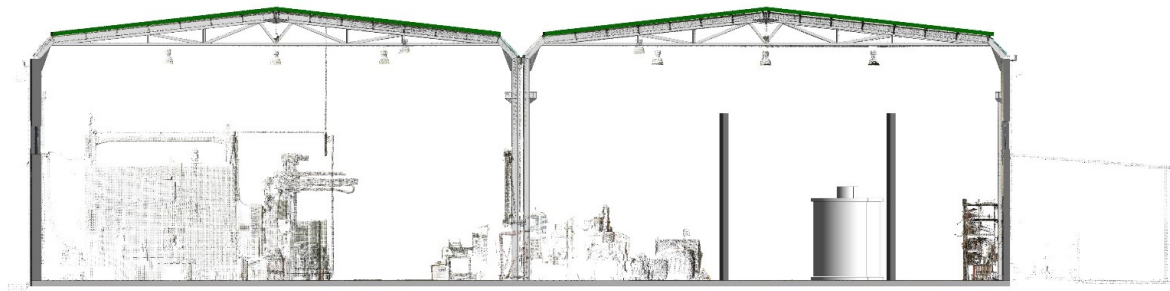
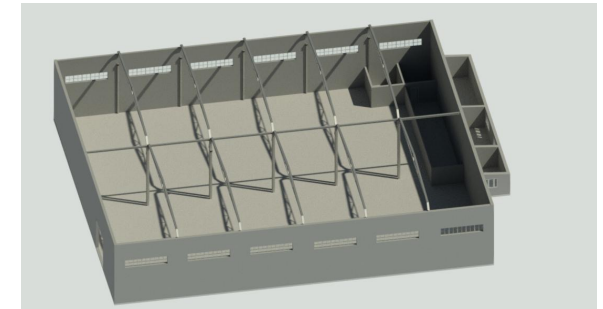
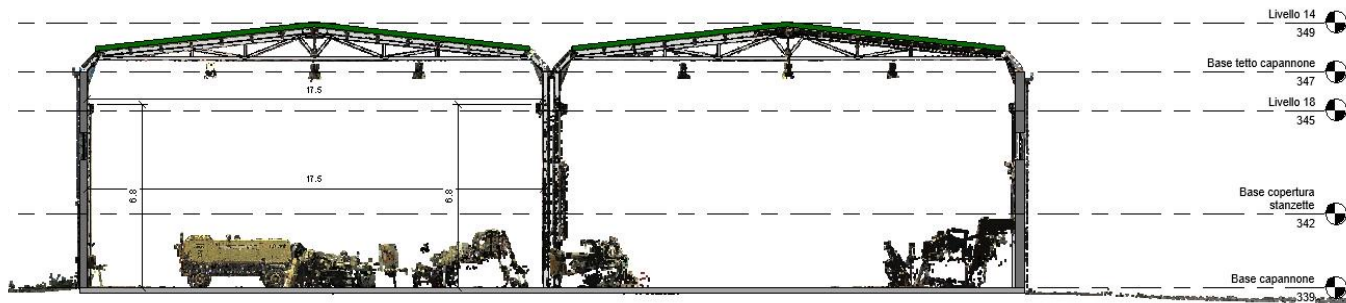
 E.ON
ENERGY RESEARCH CENTER

 uniss
UNIVERSITÀ DEGLI STUDI DI SASSARI

 IGEA SPA
INTERVENTI GEO AMBIENTALI

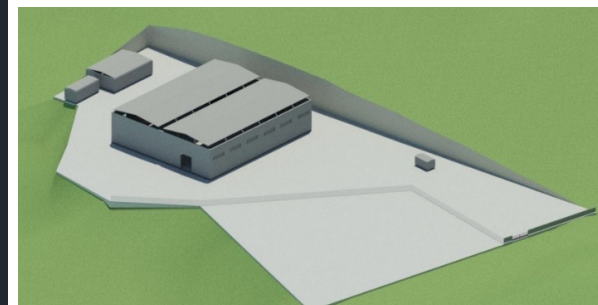
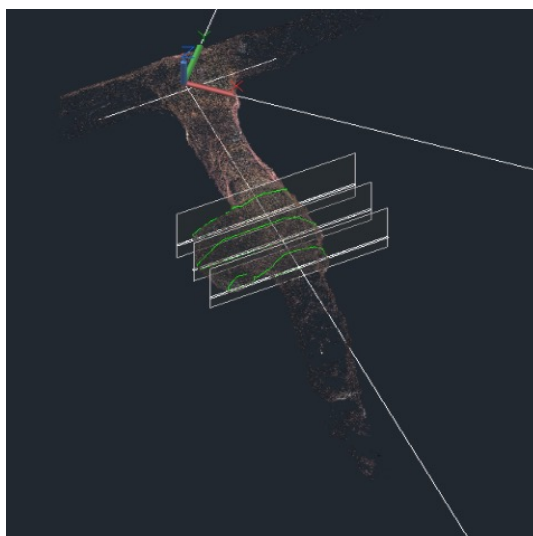
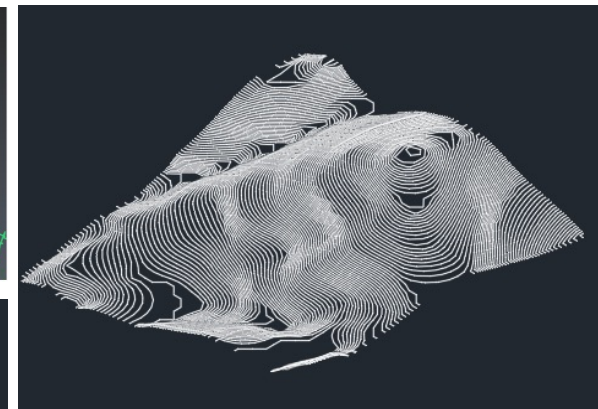
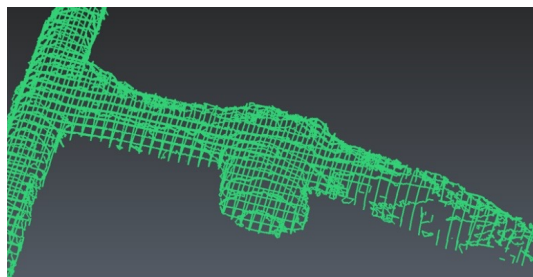
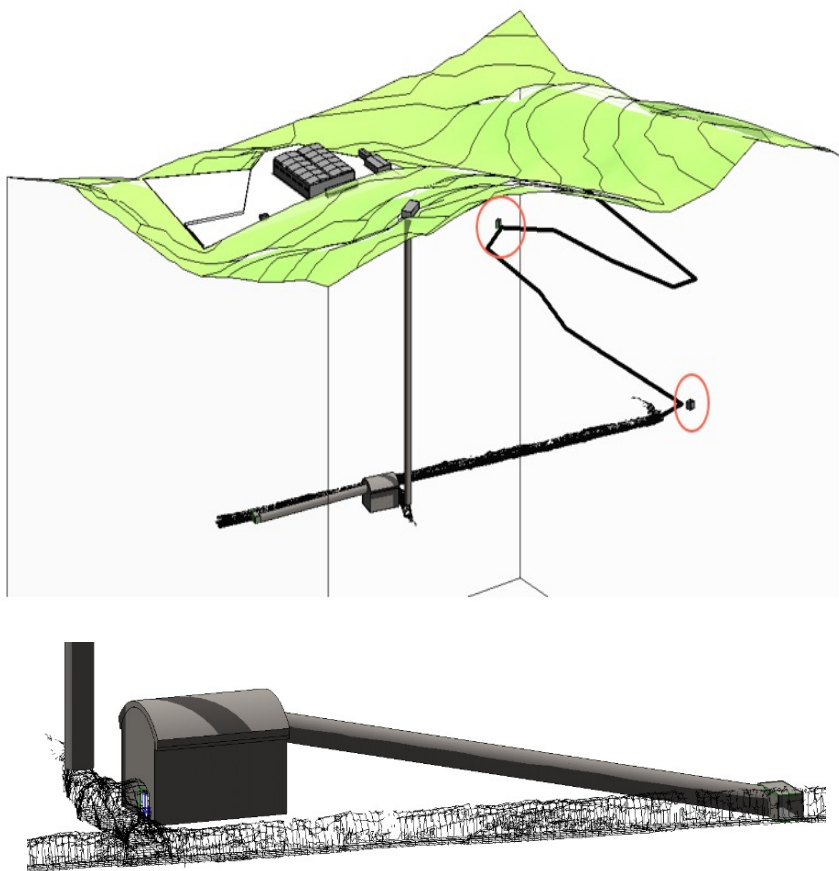
SURFACE LABORATORY

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GIS & BIM INTEGRATED 3D MODEL

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SAR-GRAV MAIN PHASES

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1st PHASE

SURFACE LABORATORY

Cost about 0,5 M€

Final stage of realization



2nd PHASE

UNDERGROUND LABORATORY FIRST INSTALLATION

Cost about 0,2 M€

Feasibility study

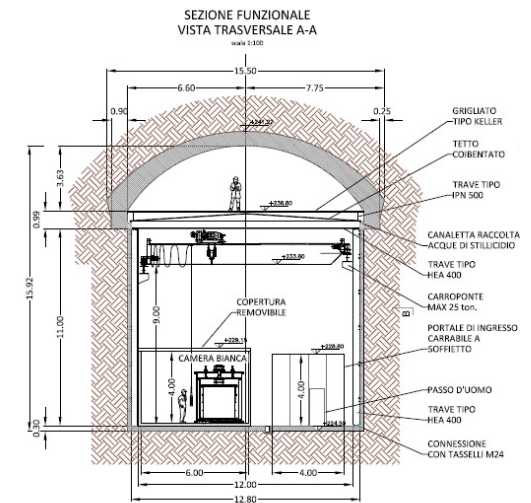


3th PHASE

UNDERGROUND LABORATORY PERMANENT INSTALLATION

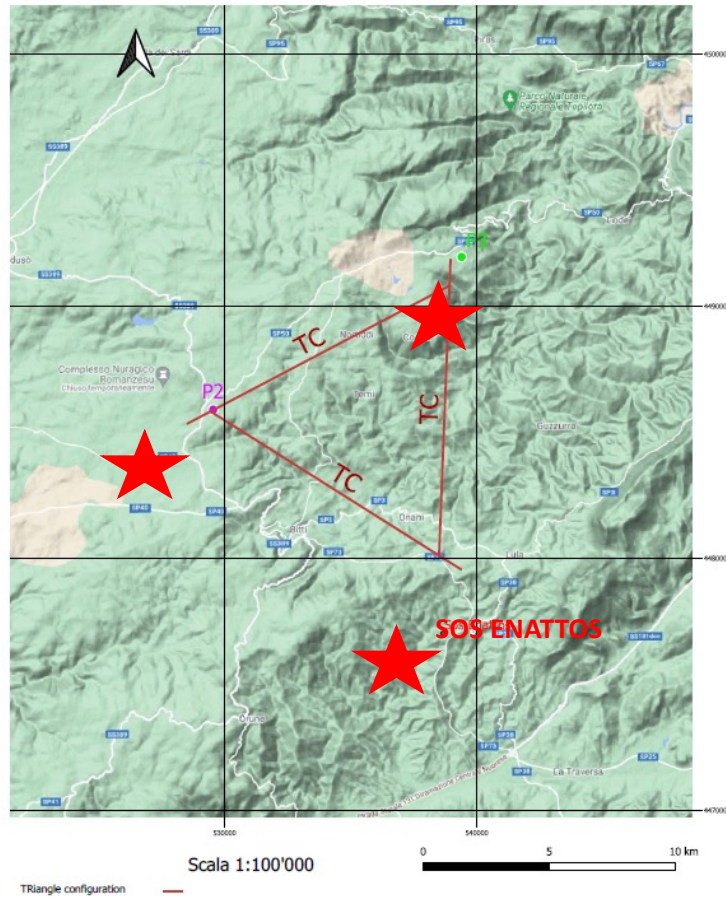
Cost about 5 M€

Advanced Design



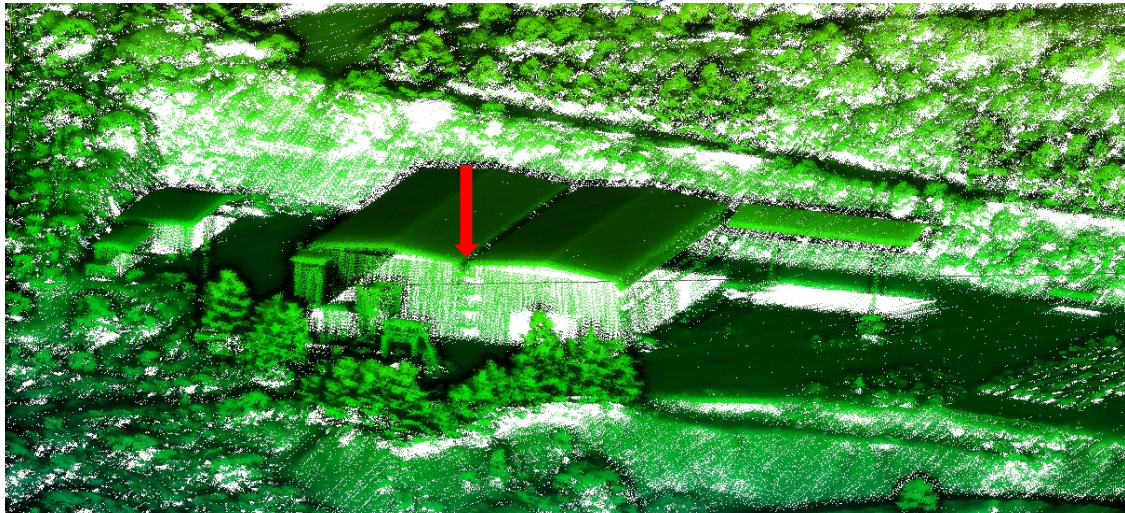
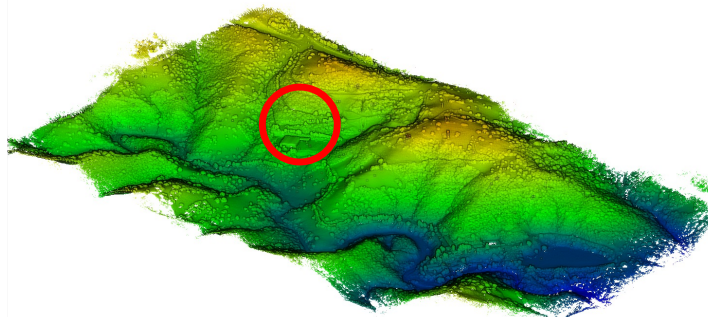
ET_GNSS - Geodetic Reference Network

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ET_GNSS - Geodetic Reference Network – Sos Enattos site

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THANKS FOR THE ATTENTION