Contribution ID: **123** Type: **talk**

Feasibility Project On the construction of the underground infrastructure for the Einstein Telescope (ET) Project -Sardinia

Monday, 17 May 2021 13:00 (20 minutes)

An overall feasibility study is carried out in Sardinia as one of potential site for the construction of the Einstein Telescope (ET), a third-generation gravitational wave underground observatory.
In order to optimize the location of the corner points of the tunnels hosting the interferometer a technical feasibility study is performed, also including cost-benefit analyses.
A 3D modeling of the ground and infrastructures represents the starting point for identifying the optimal location of the infrastructure. The design study is based on simultaneous evaluation of multiple environmental, geological and geotechnical aspects having the goal of minimize anthropogenic noises by reducing the distance from possible sources, optimize the surface facilities location and accessibility, guarantee the required rock coverage and define a proper the groundwater drainage system. In addition, a Geodetic Control Network for accurate positioning and deformation monitoring will be established.
In order to carry out a multi-criteria analysis a geo-database and GIS platform has been developed and will be continuously updated and integrated. The analysis of civil works on the surface and underground is supported by the integration with BIM models.
To enforce the capability of evaluating different geometric configurations a multiple criteria decision-making tool will be implemented to achieve that all the relevant quantitative limiting factors are compliant with scientific requirements.

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Session Classification: Recorded talks: Third Generation Infrastructures

Track Classification: Next detectors: Third generation infrastructures