

XIII ET Symposium Cagliari, 8-12 May 2023

# LARGE SCIENTIFIC INFRASTRUCTURES

Research and design experiences



UNIVERSITÀ DEGLI STUDI DI CAGLIARI

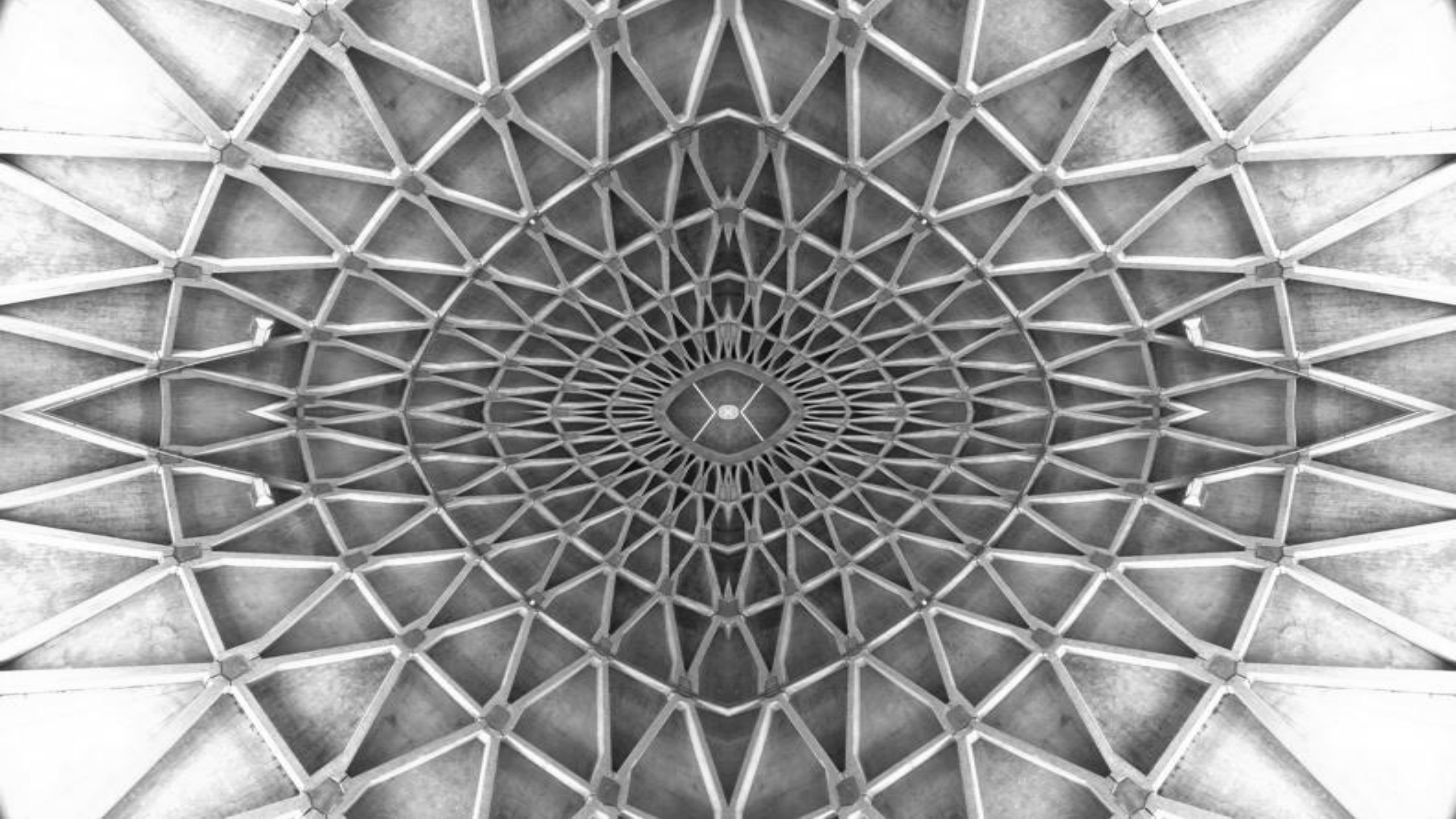
**DICAAR**

Dipartimento di Ingegneria Civile,  
Ambientale e Architettura

**Università degli Studi di Cagliari, DICAAR**

Carlo Atzeni, Stefano Cadoni, Massimo Faiferri, Stefano Mais, Silvia Mocci, Marco Moro, Fabrizio Pusceddu



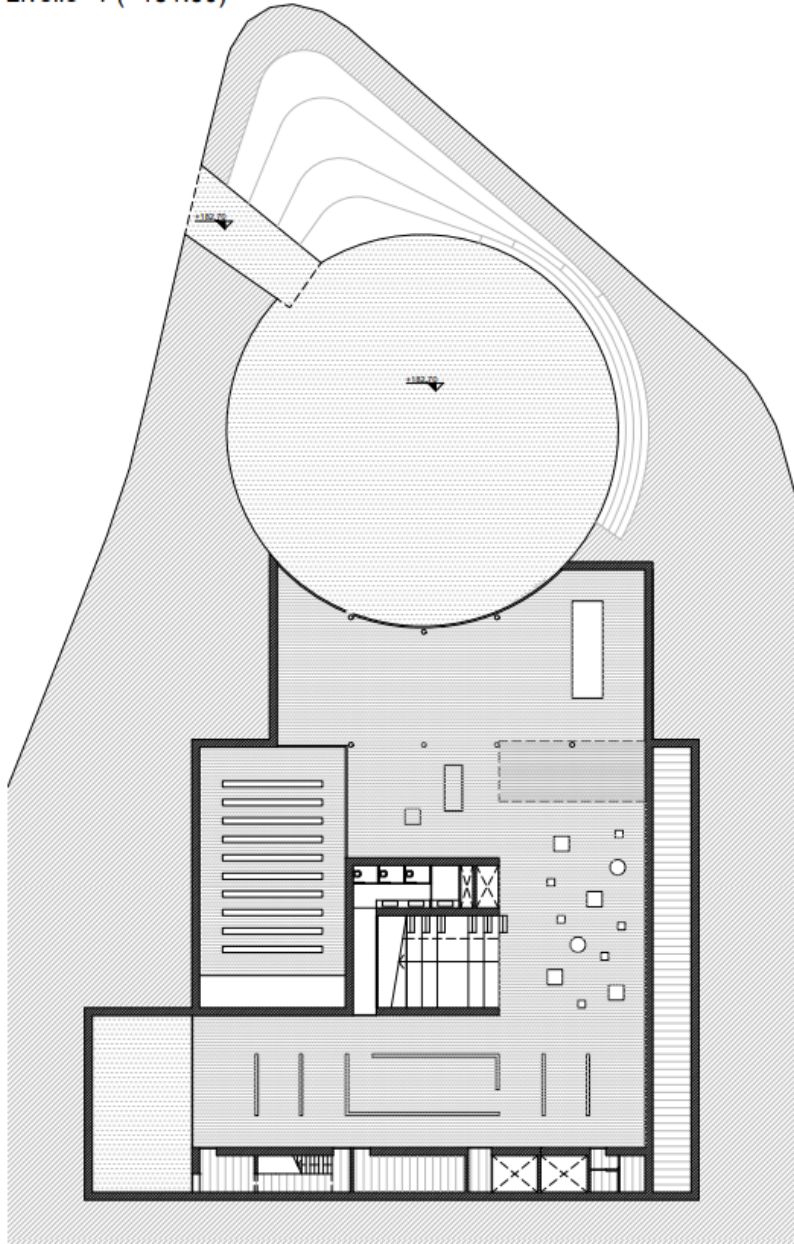




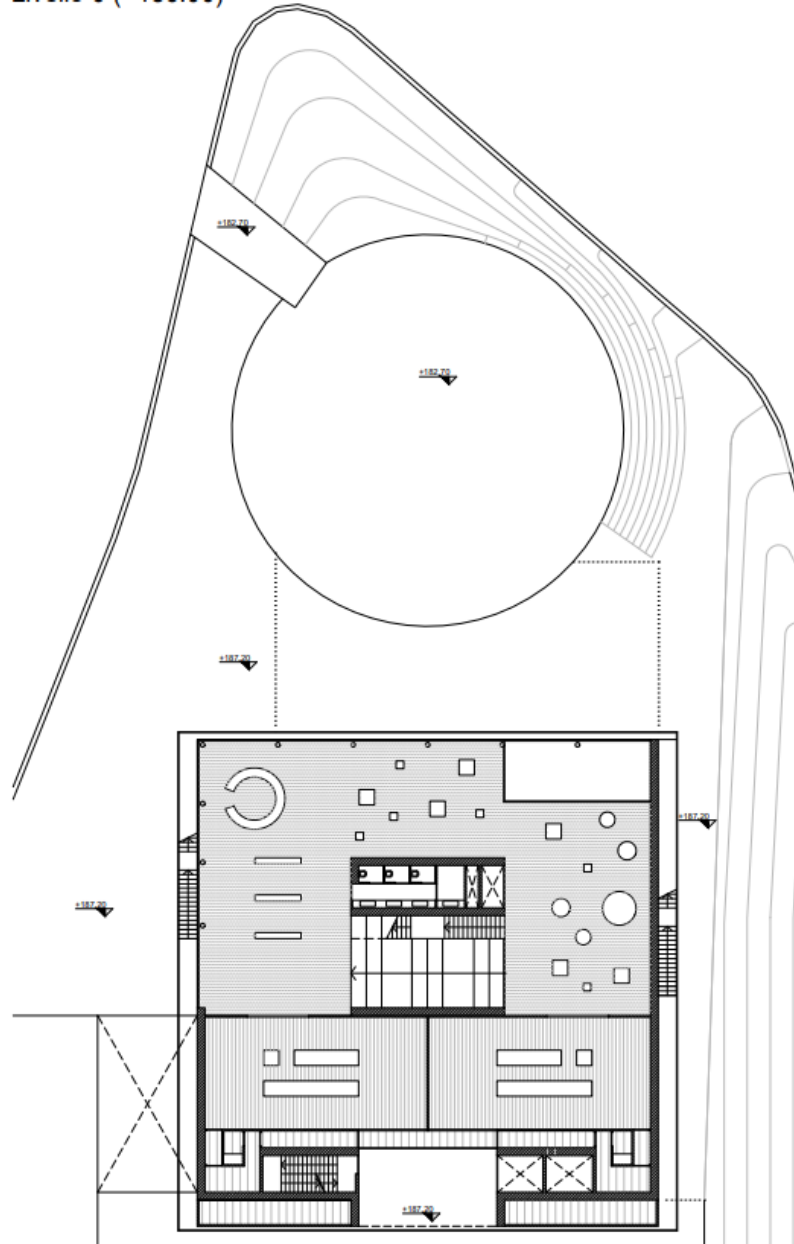




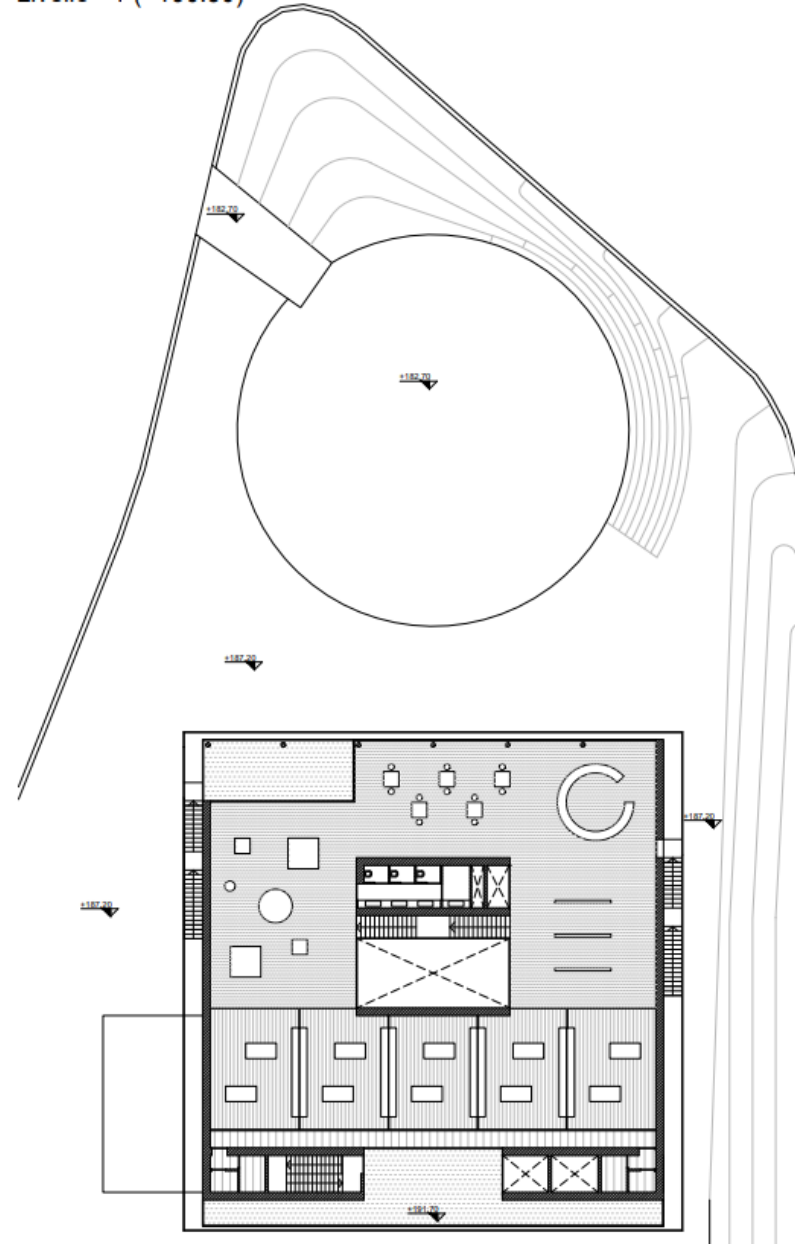
Livello -1 (+181.50)



Livello 0 (+186.00)



Livello +1 (+190.50)
















**ILS**

*Innovative Learning Spaces*

Parco Scientifico e Tecnologico  
Porto Conte Ricerche, Alghero  
dal 25 al 31 Agosto 2019

## Editions

2022		<i>Innovative Learning Spaces</i>	<b>Schools to be lived</b>
2019		<i>Innovative Learning Spaces</i>	<b>landscapes of knowledge</b>
2018		<i>Innovative Learning Spaces</i>	<b>a city for everyone</b>
2017		<i>Innovative Learning Spaces</i>	<b>urban learning spaces</b>
2016		<i>Innovative Learning Spaces</i>	<b>design of innovative learning spaces</b>

















# TOPICS

I

DAL PAESAGGIO PRODUTTIVO AL PAESAGGIO DELLA CONOSCENZA

*FROM THE PRODUCTIVE LANDSCAPE TO THE LANDSCAPE OF KNOWLEDGE*

II

IL TERRITORIO SI RACCONTA PER PRODURRE NUOVA CONOSCENZA

*THE TERRITORY DESCRIBES ITSELF TO PRODUCE NEW KNOWLEDGE*

III

LA SCALA DELLA CONOSCENZA

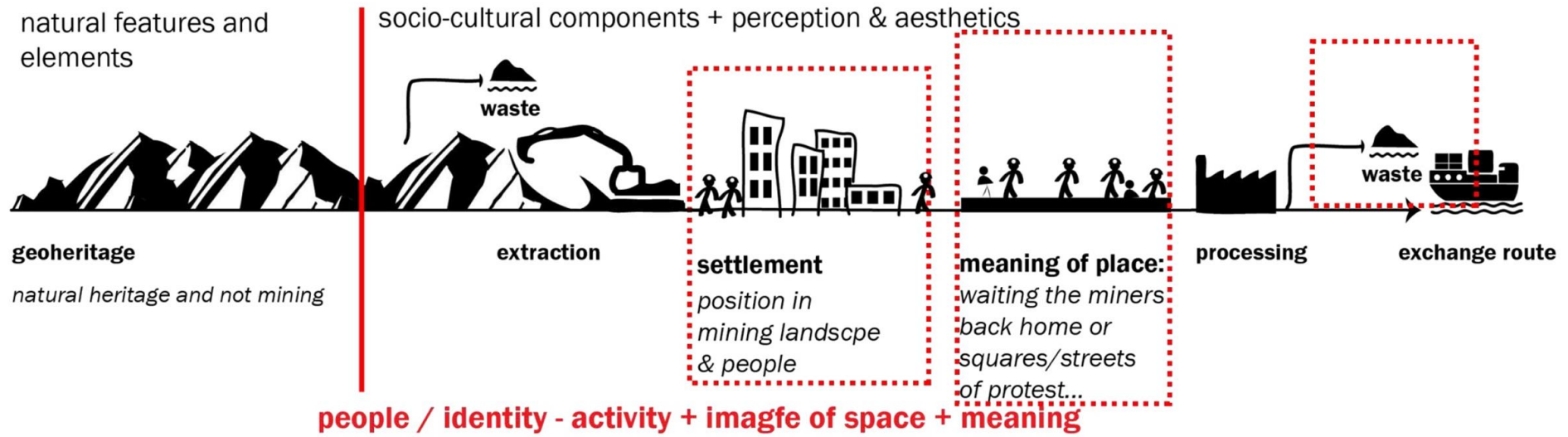
*THE SCALE OF KNOWLEDGE*

IV

I DISPOSITIVI SPAZIALI DELLA CONOSCENZA PER LE COMUNITÀ DI APPRENDIMENTO

*THE SPATIAL APPARATUS OF KNOWLEDGE FOR LEARNING COMMUNITIES*

## Geo-mining Landscape



**MATERIAL**  
**IMMATERIAL**

**VISIBLE**  
**INVISIBLE**

**UPSIDE**  
**DOWN**

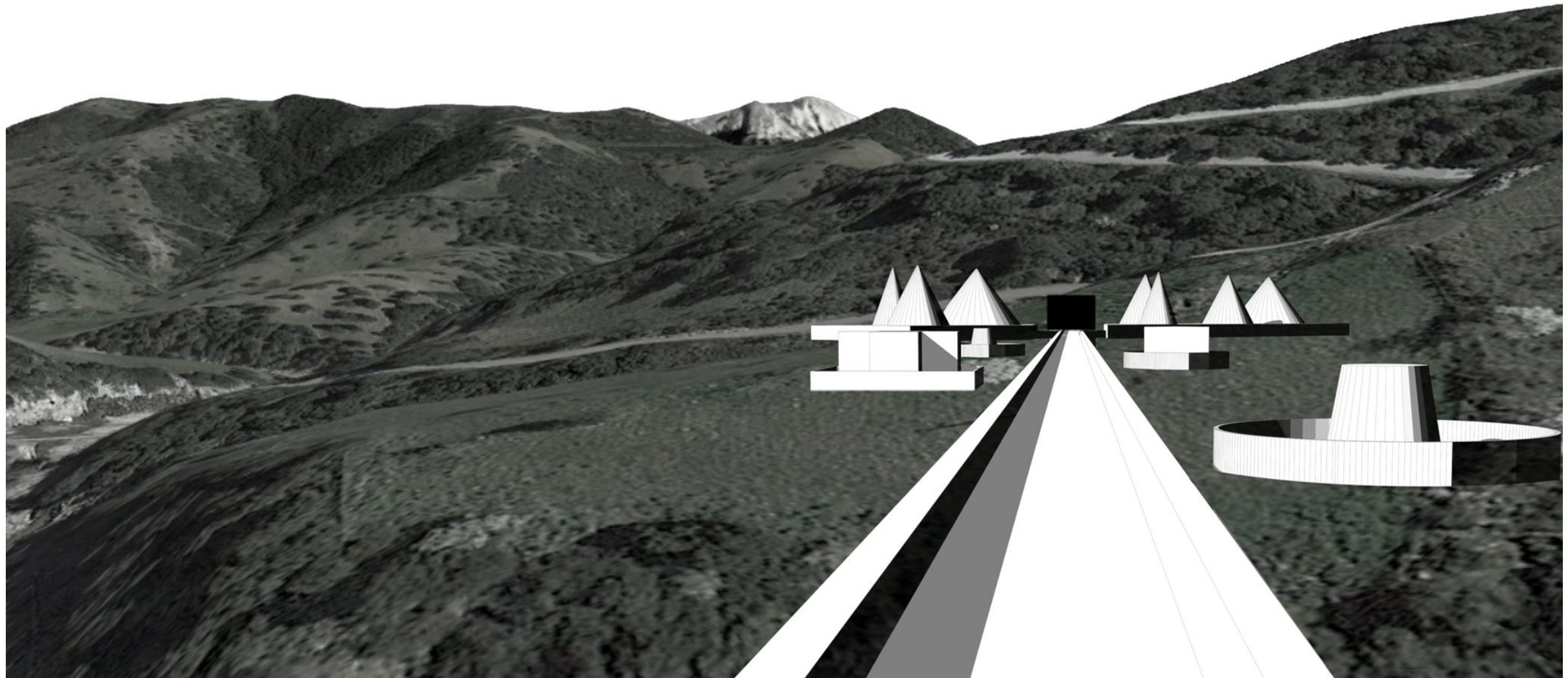
**FULL**  
**EMPTY**

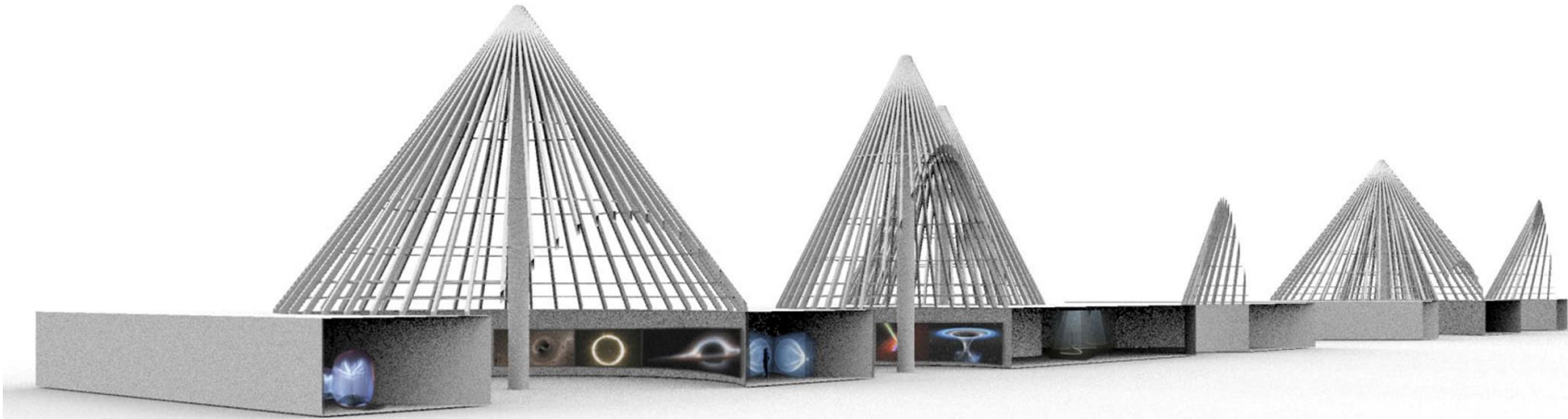
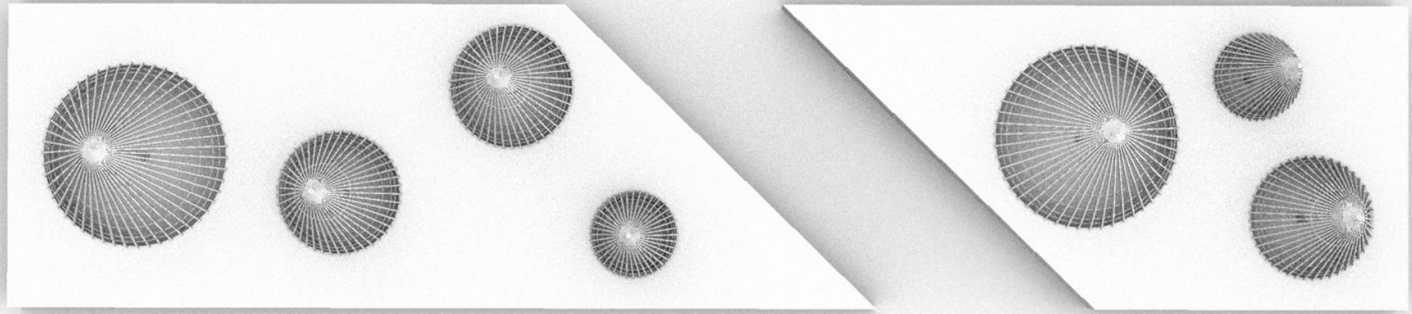


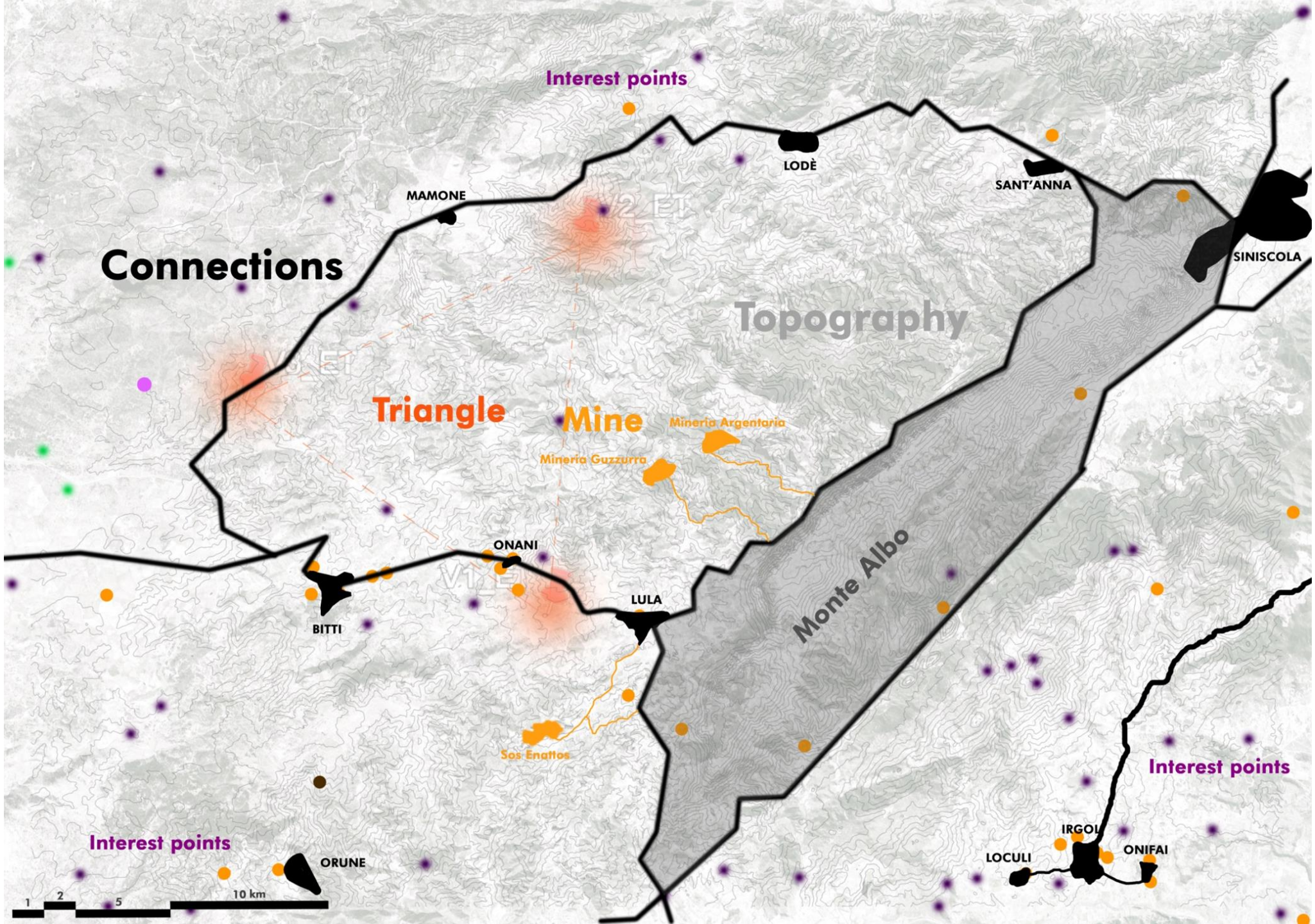


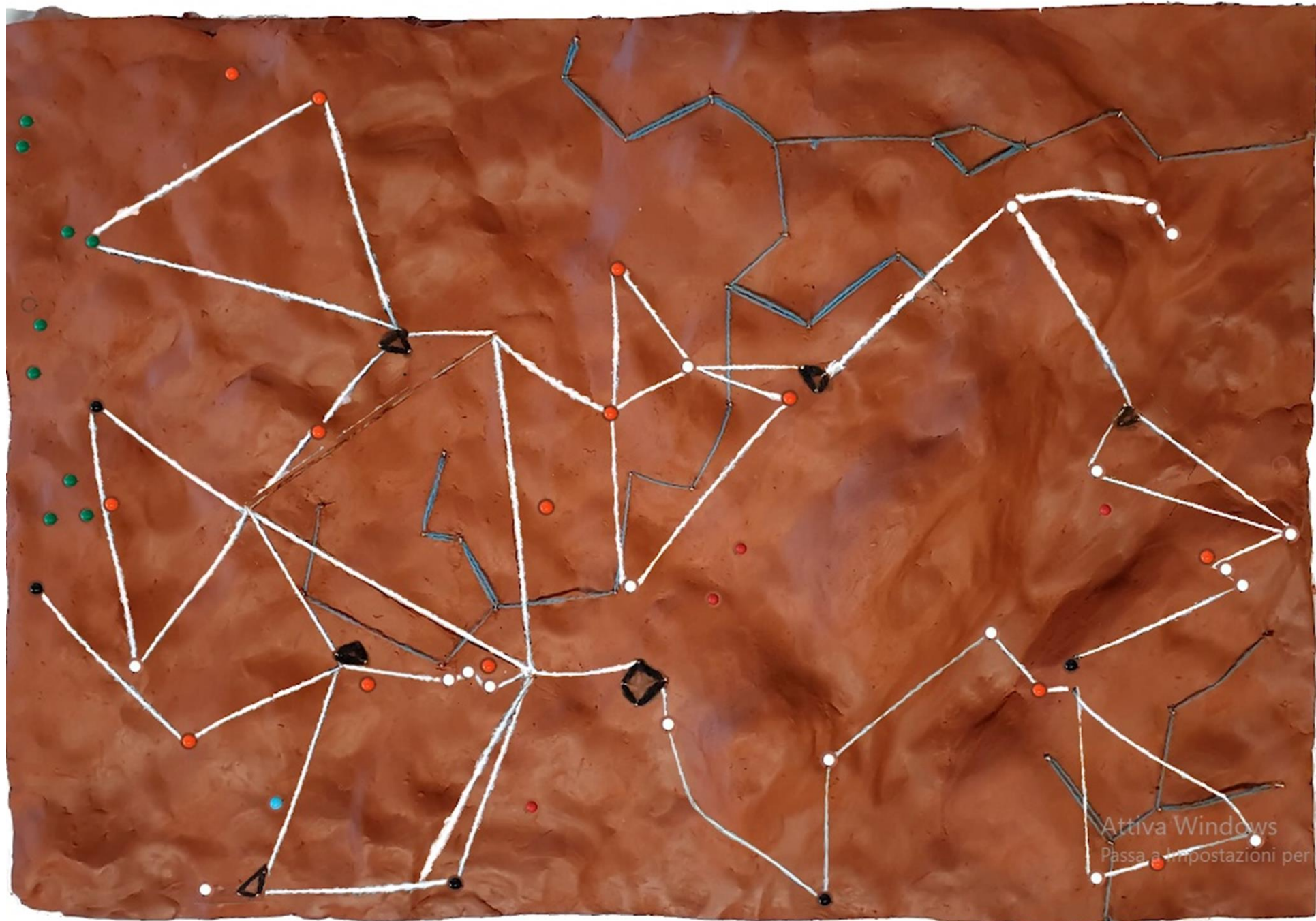












**COME RENDERE VISIBILE L'INVISIBILE**  
**HOW TO MAKE THE INVISIBLE VISIBLE**

**Attraverso i fili che compongono e organizzano la vita**  
**Through the threads that compose and organize life**



# gravitational waves architecture

## Einstein Telescope in Sardinia

The installation aims to offer a synaesthetic experience in which visitors perceive the underground dimension of the Einstein Telescope (ET), the ambitious project developed in Sardinia in the ex mining site of Sos Enattos in Lula, for the construction of a gravitational wave observatory, capable of capturing signals from astrophysical sources throughout the universe. A series of exhibition displays, called "diabolos", define the exhibition path, hosting transmedia contents in which the most relevant project experiences on the actors, physicists, architects, researchers, but also local communities and students involved in the ILS Scientific School "Innovative Learning Spaces" – 2019 edition – are narrated. The surface architecture project, currently in progress with the collaboration of Equipo Mazzanti and Ecurbanlab research laboratory in close relation to the underground scientific infrastructure, will define a wider project for the redevelopment of the old mines and the construction of a new landscape of knowledge.

L'installazione mira a offrire un'esperienza sinestetica nella quale i visitatori percepiscono la dimensione ipogea dell'Einstein Telescope (ET), l'ambizioso progetto sviluppato in Sardegna, presso il sito minerario di Sos Enattos a Lula, per la realizzazione di un osservatorio di onde gravitazionali in grado di captare i segnali provenienti da sorgenti astrofisiche dall'intero universo. A serie di display, chiamati "diabolos", definisce il percorso espositivo, ospitando contenuti transmediali in cui sono narrate le esperienze progettuali sviluppate dagli attori coinvolti, fisici, architetti, ricercatori, ma anche le comunità locali e gli studenti impegnati nell'ambito della Scientific School "Innovative Learning Spaces" – edizione 2019. E oggi in corso l'elaborazione del progetto delle architetture di superficie, con la collaborazione dell'Equipo Mazzanti e del laboratorio di ricerca Ecurbanlab, che, in stretta relazione con l'infrastruttura scientifica ipogea, parteciperà alla definizione di un grande progetto di riqualificazione delle vecchie miniere e di costruzione di un inedito paesaggio della conoscenza.

BIENNIO EUROPEO 2021  
589  
2019-2021

VENEZIA  
RESIDENZIALE

TESTE BIANCHE VERGINE

2

PRODIGIONE ITALIA



ragilant  
comunitas  
comunita  
ragilanti

A cura di  
Eugenio Caccia  
Massimo Faiferi  
Giancarlo Mazzanti  
Michele Punturo

con  
Lino Cabras  
Fabrizio Pusceddu



da tagliare

ecourbanlab  
<http://www.ecourbanlab.it/>

### LANDSCAPES OF KNOWLEDGE INTERNATIONAL SCIENTIFIC SCHOOL

ILS - Innovative Learning Spaces is the scientific school conceived and organised by DADU, Department of Architecture, Design and Urbanism, of the University of Sassari, in collaboration with national and international prestigious research institutions, with the contribution of Sardegna Ricerche. The aim of the scientific school, now in its fifth edition, is the investigation of new forms and methods of learning and how they can reciprocally affect space design, reinterpreting the city and the territory as an extended platform of knowledge. The 2019 edition focused on the design of a great scientific infrastructure, the Einstein Telescope (ET) – project for a latest generation observatory of gravitational waves – and its possible relationships with local communities, to achieve development opportunities for the small hamlets located at the foot of Montalbo mountain chain in Sardinia. The proposals, developed by different teams of professors, students and professionals, investigated both the spatial and social role of such infrastructures through an interdisciplinary approach, as well as their economic implications, to trigger virtuous processes.



curators

Massimo Faiferi  
Saverio Barbacci  
Fabrizio Pusceddu  
Lino Cabras  
Rosa Mencia  
Laura Pujia  
Francesca Ansa



### RENDERE VISIBILE L'INVISIBILE I FILI DELLA VITA

The project proposal for the Einstein Telescope – great scientific infrastructure for the study of gravitational waves – in particular referred to its epigean part, is a big opportunity to reconsider the territory by defining a physical and conceptual network, an apparatus able of making the invisible visible through landscape systems, coloured threads that unite and make each part perceptible as an opportunity for relationships between different elements. The first system aims to suggest the perception of the mine in the outward landscape. Large transmission towers with big guywires cables reproduce the geometric shape of the triangle, connecting each vertex of the ET project: places to concentrate spaces for scientific dissemination and getting in contact with the research activities developed underground. The second system aims to unite the urban centers and make visible what is produced in the surrounding territories. The design concept is translated into a new path linking the hamlets of the area. In the third system the territory is marked through the use of poles about fifty metres high, where coloured fabrics mark the areas of great landscape value.



curators

El Equipo Mazzanti  
Eugenio Caccia  
Nicola Sanchez  
Julian Villaverde

Ecurbanlab

Massimo Faiferi  
Saverio Barbacci  
Fabrizio Pusceddu  
Lino Cabras  
Laura Pujia



### SARGrAV – ET EINSTEIN TELESCOPE

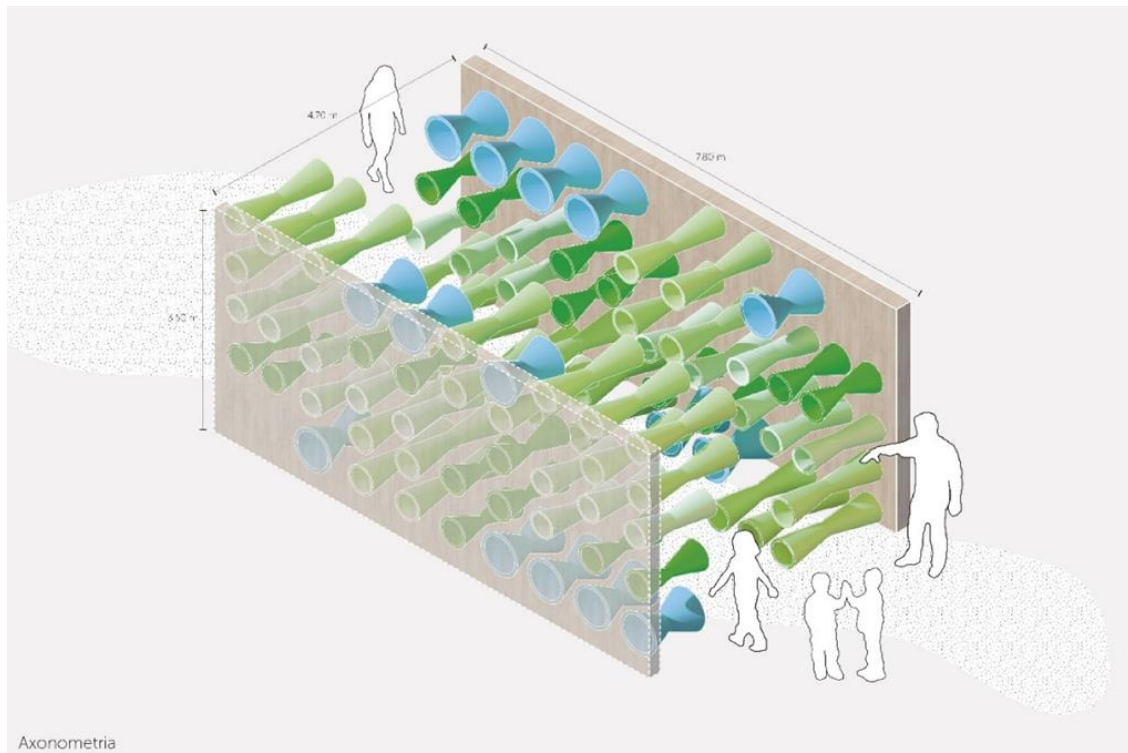
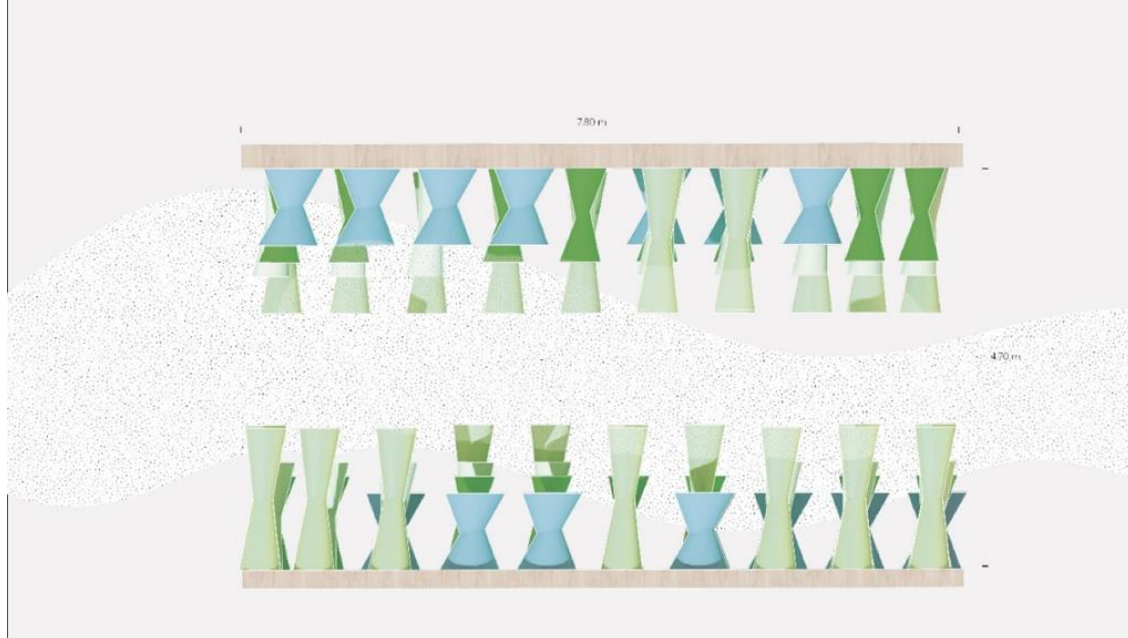
Gravitational waves are one of the main consequences of the theory of general relativity formulated more than one hundred years ago by Albert Einstein and experimentally observed thanks to the international collaboration LIGO-VIRGO and the joint operation of the three interferometers in US and Italy. The detection of gravitational waves is one of the most important discoveries of the century and has revolutionised the way we observe and study the Universe. Einstein Telescope (ET) is the ambitious European project that aims to build a latest-generation gravitational wave observatory. One of the two candidate sites in Europe to host the great scientific infrastructure is located in Sardinia, in the ex mining site of Sos Enattos in Lula, where, with the support of the "Regione Autonoma della Sardegna", a pilot laboratory – SarGrav – has already been installed. The Italian institutions collaborating in the project are: INFN – Istituto Nazionale di Fisica Nucleare INAF – Istituto Nazionale di Astrofisica INGV – Istituto Nazionale di Geofisica e Vulcanologia and the University of Sassari and the University of Cagliari



curatore

Progetto SarGrav - Progetto ET  
Eugenio Caccia  
Michele Punturo  
Vincenzo Nappitano



















1. EUSPARC - INFN Laboratori Nazionali di Frascati

P. Campana, S. Incremona, S. Cantarella, R. Ricci, U. Rotundo, S. Vescovi  
M. Faiferri, S. Bartocci, L. Cabras, C. Cannaos, R. Manca, D. Polese, F. Pusceddu, E. Turco

2. ILS - Landscape of knowledge

M. Faiferri, S. Bartocci, F. Arras, L. Cabras, R. Manca, F. Pusceddu, F. Rango

3. Gravitational Waves Architecture - Venice - 18th International Architecture Exhibition

E. Coccia, M. Faiferri, G. Mazzanti, M. Punturo – con L. Cabras, F. Pusceddu

4. Science Centre - INFN Laboratori Nazionali di Frascati

P. Campana, S. Incremona, P. Angeletti, S. Bertelli, S. Cantarella, D. Domenici, R. Ricci, U. Rotundo  
M. Faiferri, S. Bartocci, F. Pusceddu, R. Manca, F. Mistretta

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