L'ETA' ADULTA DI NHAZCA

NATURAL HAZARDS CONTROL AND ASSESSMENT

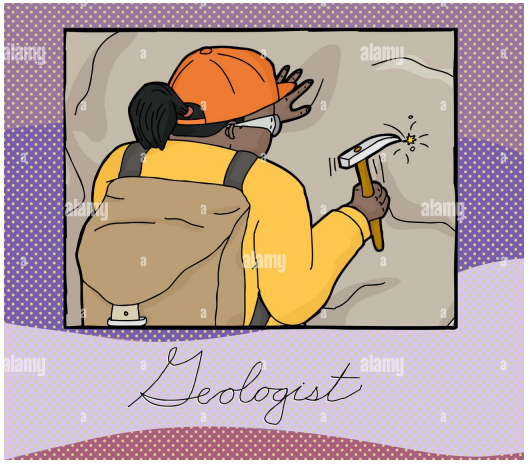
una start up di Sapienza

SAPIENZA
UNIVERSITÀ DI ROMA

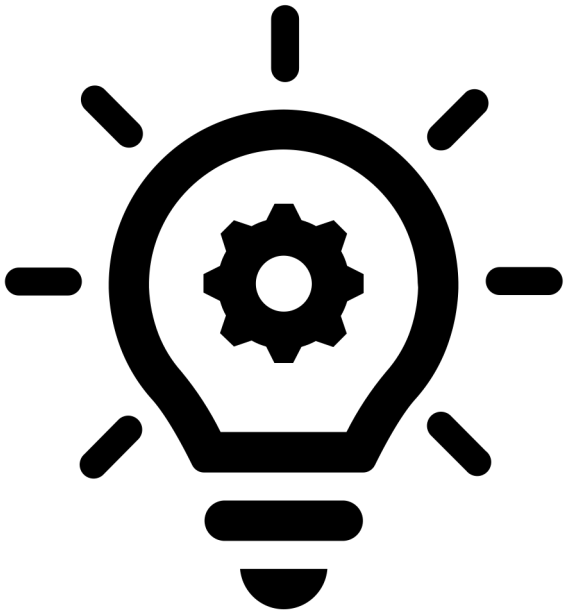
Francesca Bozzano, DST, CERI

Francesca Bozzano

- GEOLOGA, GEOLOGA APPLICATA
- mi occupo di rischi geologici e dei progettazione geologica di opere e interventi sul territorio.
- Il mio insegnamento principale nella LM GAITR: geologia applicata alle costruzioni
- opero nel Dipartimento di Scienze della Terra e del centro di ricerca interdipartimentale CERI «PrevIsione, Prevenzione e Controllo dei Rischi Geologici
- nel 2009 socio-co-fondatore dell'azienda di spin-off Sapienza Nhazca, dal 2021 start up Sapienza

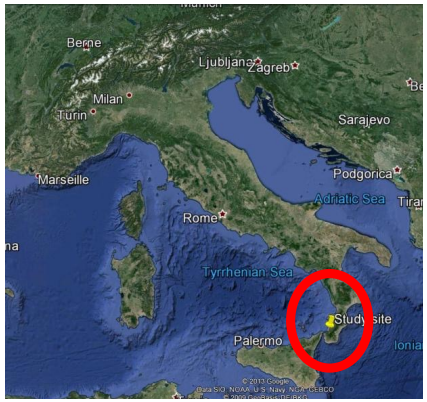


2000 – 2010: la diffusione del monitoraggio satellitare e delle tecnologie in remoto



LA NOSTRA CILIEGINA SULLA TORTA

Galleria San Giovanni, sulla autostrada SA-RC: quando noi decidiamo di applicare la tecnologia radar terrestre alla gestione in corso d'opera di una galleria all'interno di un versante di frana



Galleria San Giovanni

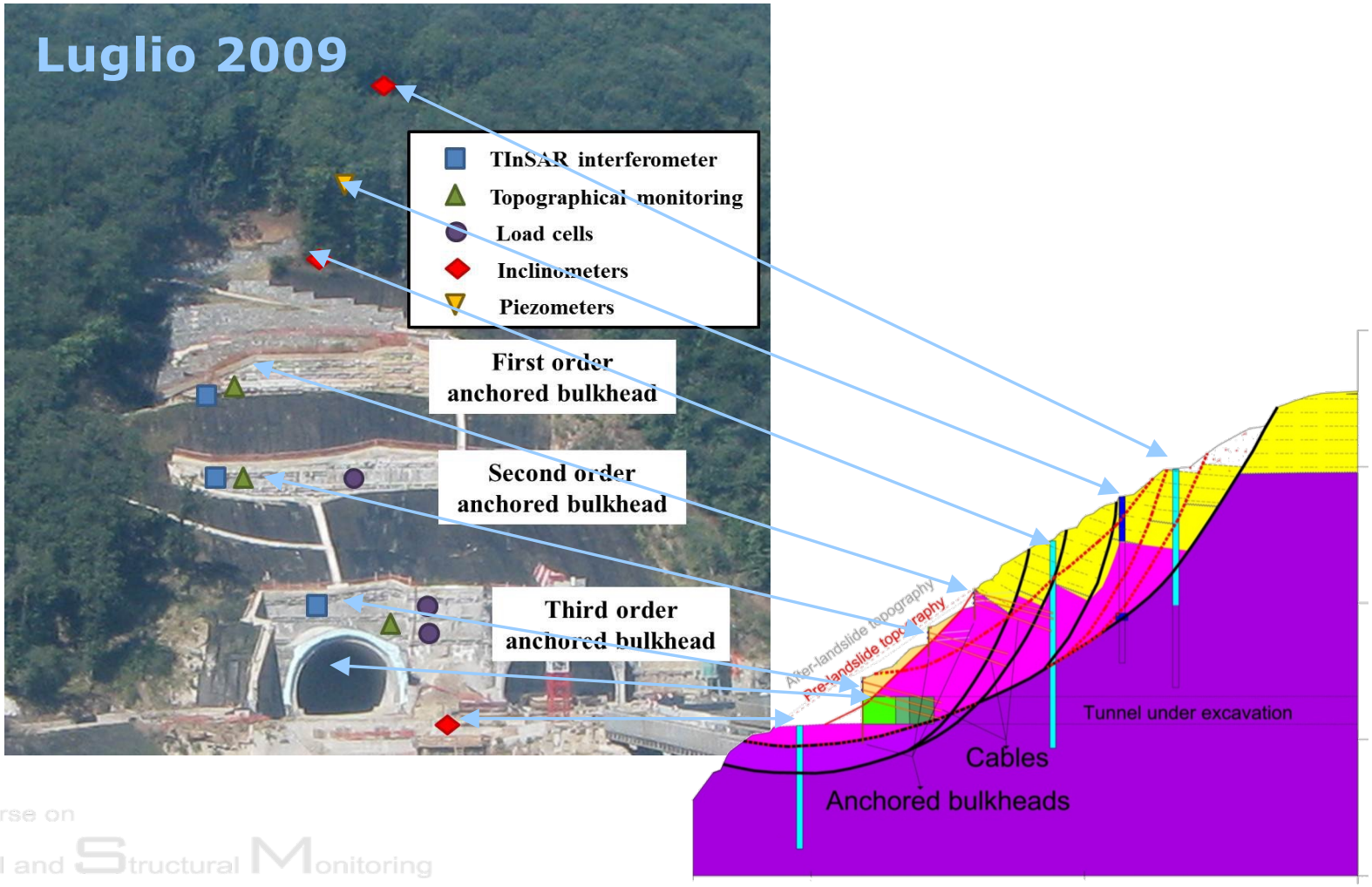
LA FRANA

Febbraio 2007

Marzo 2007

V= 10,000m³

IL SISTEMA DI MONITORAGGIO INTEGRATO DEL VERSANTE SAN GIOVANNI



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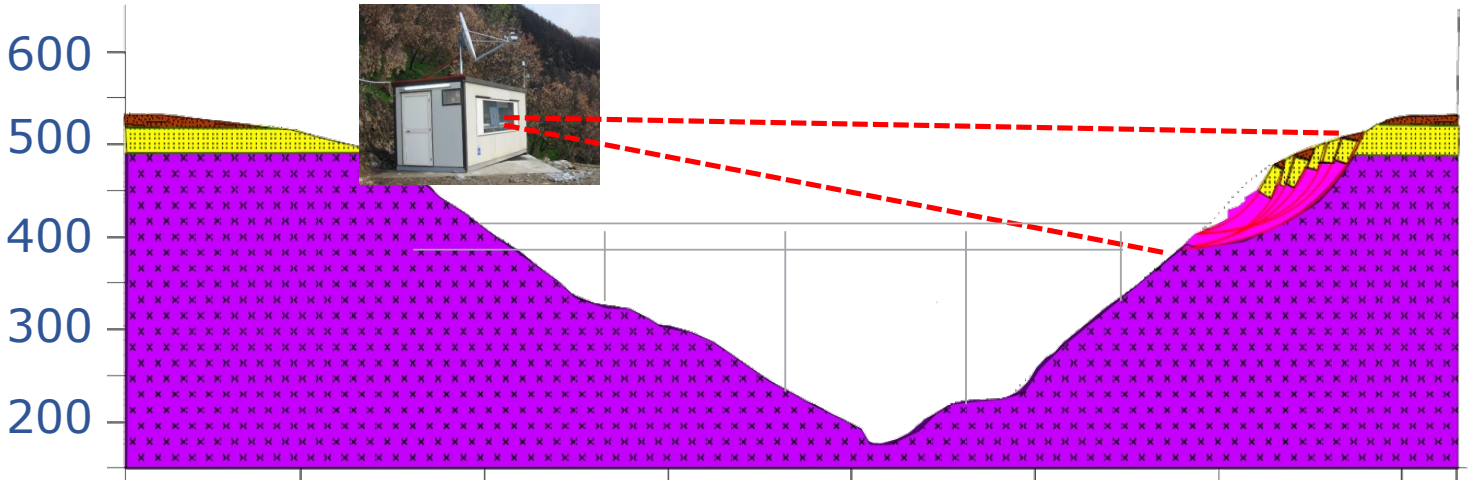
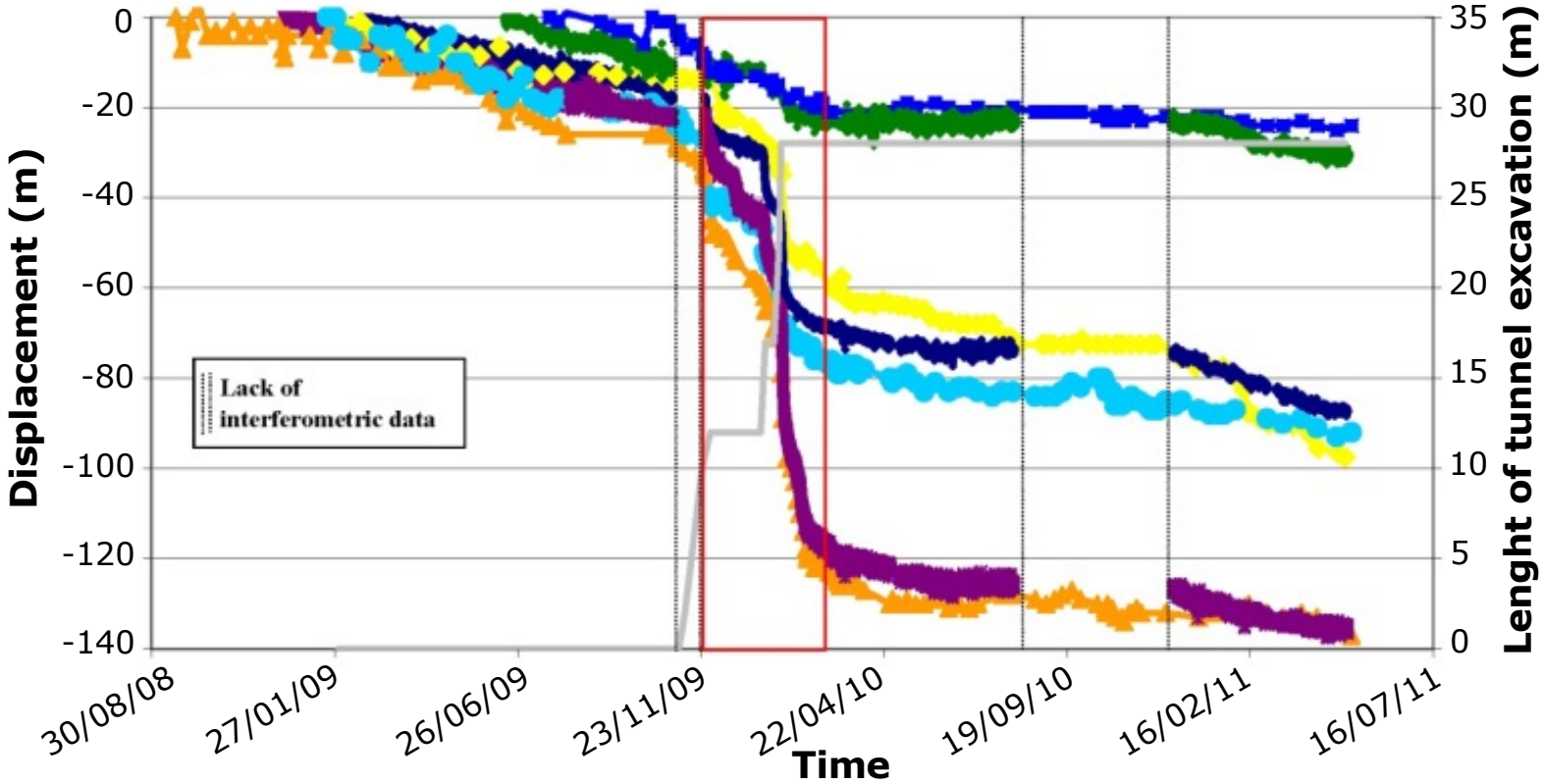
Geotechnical and Structural Monitoring

Monitoraggio in remoto T-InSAR



Early warning



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DOI: 10.4408/IJEGE.2008-02.O-05

PIATTAFORMA RADAR PER IL MONITORAGGIO IN CONTINUO DI UNA FRANA CHE INTERAGISCE CON UNA GRANDE INFRASTRUTTURA IN COSTRUZIONE

A RADAR PLATFORM FOR CONTINUOUS MONITORING OF A LANDSLIDE INTERACTING WITH AN UNDER-CONSTRUCTION INFRASTRUCTURE

FRANCESCA BOZZANO(*), PAOLO MAZZANTI(**) & ALBERTO PRESTININZI(*)

Nat Hazards (2011) 59:1377–1396
DOI 10.1007/s11069-011-9840-6

ORIGINAL PAPER

Displacement patterns of a landslide affected by human activities: insights from ground-based InSAR monitoring

Francesca Bozzano · Ivan Cipriani · Paolo Mazzanti · Alberto Prestininzi

International Journal of Rock Mechanics & Mining Sciences 67 (2014) 69–77

Contents lists available at ScienceDirect

International Journal of Rock Mechanics & Mining Sciences

journal homepage: www.elsevier.com/locate/ijrmms

A field experiment for calibrating landslide time-of-failure prediction functions

Bozzano Francesca[a,b,c], Cipriani Ivan[a], Mazzanti Paolo[a,c,*], Prestininzi Alberto[a,b]

geosciences

MDPI

Article

Assessment of Landslide Pre-Failure Monitoring and Forecasting Using Satellite SAR Interferometry

Serena Moretto [1,2,*], Francesca Bozzano [1,2], Carlo Esposito [1], Paolo Mazzanti [1,2] and Alfredo Rocca [2]

ICL/IPL Activities

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Published online: 1 May 2010
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Francesca Bozzano · Paolo Mazzanti · Alberto Prestininzi · Gabriele Scarascia Mugnozza

Research and development of advanced technologies for landslide hazard analysis in Italy

Original Paper

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Paolo Mazzanti · Francesca Bozzano · Ivan Cipriani · Alberto Prestininzi

New insights into the temporal prediction of landslides by a terrestrial SAR interferometry monitoring case study

Discussion

Landslides
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Received: 10 October 2017
Accepted: 13 March 2018
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Francesca Bozzano · Paolo Mazzanti · Serena Moretto

Discussion to: 'Guidelines on the use of inverse velocity method as a tool for setting alarm thresholds and forecasting landslides and structure collapses' by T. Carlà, E. Intrieri, F. Di Traglia, T. Nolesini, G. Gigli and N. Casagli

remote sensing

MDPI

Article

The Role of Satellite InSAR for Landslide Forecasting: Limitations and Openings

Serena Moretto [1,2,*], Francesca Bozzano [1,2] and Paolo Mazzanti [1,2]

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2024
2009

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VISION

Pioneering the geohazard analysis, monitoring and management market segment by making complex data actionable for resilient and sustainable natural and built environments

MISSION

Provide efficient, reliable, innovative and high-quality consultancy and services for the analysis and monitoring of natural hazards and structural health monitoring to support the design and management of large-scale projects.

OUR MOTTO: ***Translating data into actionable information!***

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APPLICATIONS - MAIN SECTORS

1: **Civil protection**
Natural Hazards assessment and risk mitigation

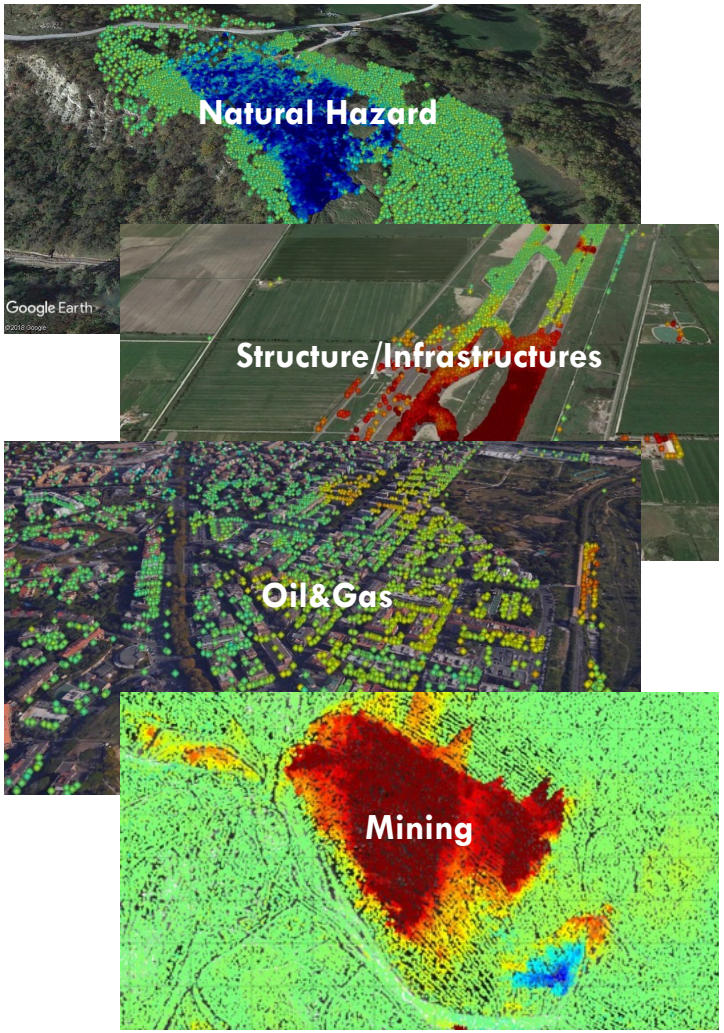
2: **Highway/railway industry**

3: **Hydropower & Energy sector**

4: **Oil & Gas**

5: **Mining**

6: **Cultural Heritage**



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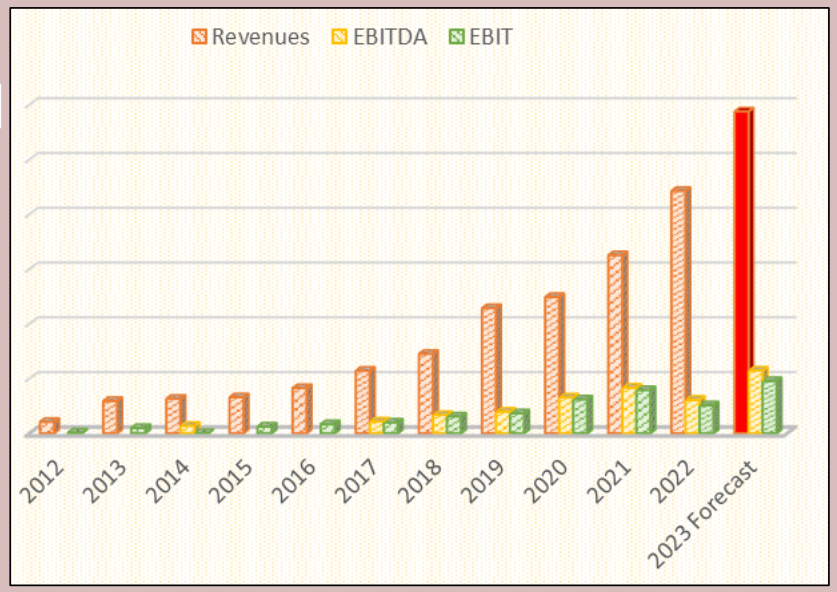
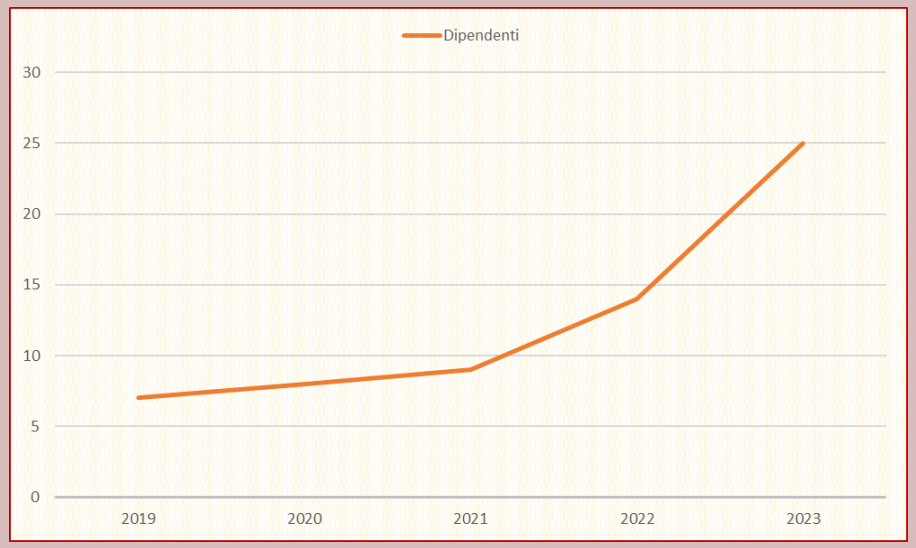
TURNOVER TREND

€

3 M€



EMPLOYEES



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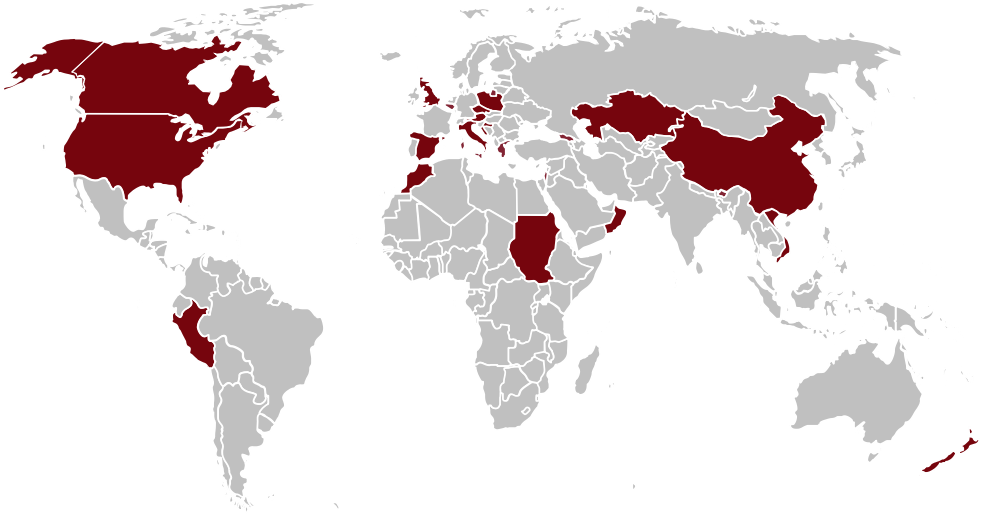
OUR CLIENTS



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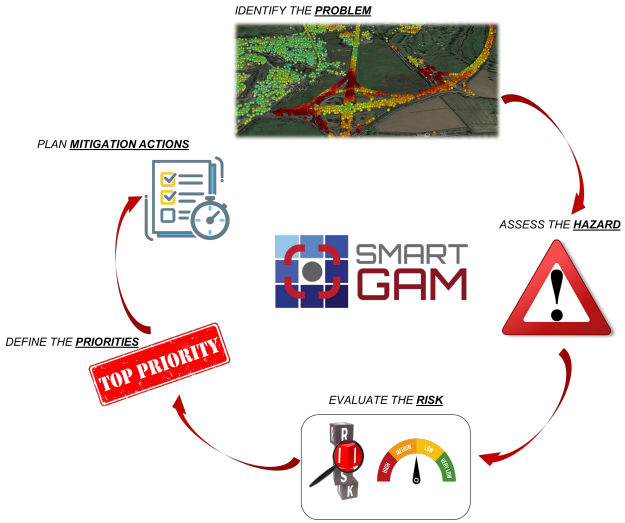
ASSETS – *RECENT TECHNOLOGIES*

SMART GAM

SMART GEOTECHNICAL ASSET MANAGEMENT, innovative, **STANDARD** and **REPEATABLE** approach for the analysis of **GEOTECHNICAL ASSETS** aimed at **PREDICTIVE MAINTENANCE** and **RISK REDUCTION,** based on **SATELLITE DATA** and **GROUND SEGMENT** information.



PERIODIC PHOTOMONITORING BY SMARTPHONE PHOTOMONITORING for **PERIODIC CHANGE DETECTION** analyses on structures or natural elements (e.g. slopes, landslides) by **QUICK SURVEYS** with **LOW-COST SENSORS** (e.g. smartphones, DLSR etc.). The goal of the technology is to **ENRICH DATA** by leveraging the large quantity of sensors available all over.

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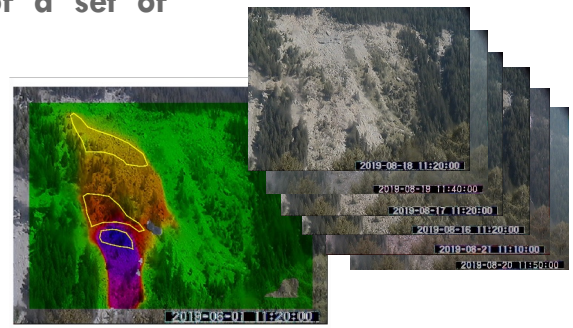
ASSETS – *OUR BRANDS*

PRIMO
by NHAZCA S.r.l.

PRIMO is PRompt Intervention Monitoring, the service offered by **NHAZCA** for the deployment of emergency monitoring solutions in less than 48 hours, in case of landslide or failure events.

PHOTOMONITORING

PhotoMonitoring is an innovative and unique monitoring approach, based on change detection and displacement analysis of a set of images, acquired from ground cameras, drones, satellites.



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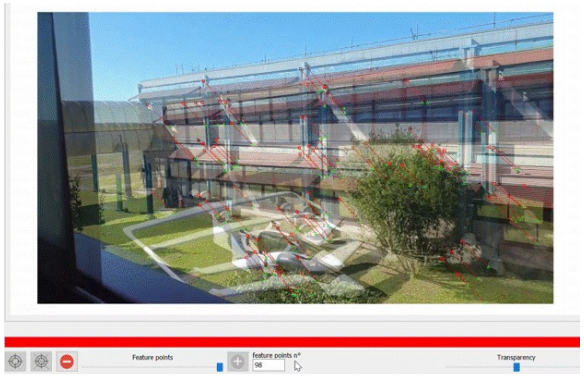
ASSETS – *PATENTS**

CARE | CAMERA REGISTRATION AND ALIGNMENT UTILITY

CARE – Camera Registration and Alignment is the innovative system designed and developed by **NHAZCA**, allowing for **PHOTOMONITORING PERIODIC SURVEYS**. **CARE** allows the **PRECISE RE-POSITIONING** of the photographic sensor, thus minimizing processing errors and providing unprecedented **RELIABLE RESULTS**.



ROCKFALL DETECTOR is a methodological **PHOTOMONITORING** approach for the automatic identification, classification, mapping and inventory of **ROCKFALLS**, based on the analysis of **GIGAPIXEL IMAGES** continuously collected on hazardous scenarios (sea cliffs, rock slopes), allowing to capture from very small to large magnitudes events.

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ASSETS – *OUR SOFTWARE*

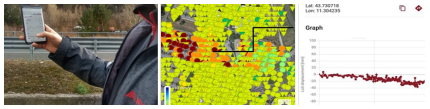
Software

TRIVIA | TERRESTRIAL RADAR INTERFEROMETRIC VISUALIZATION & ANALYSIS

TRIVIA
Terrestrial RADAR Interferometric Visualization & Analysis

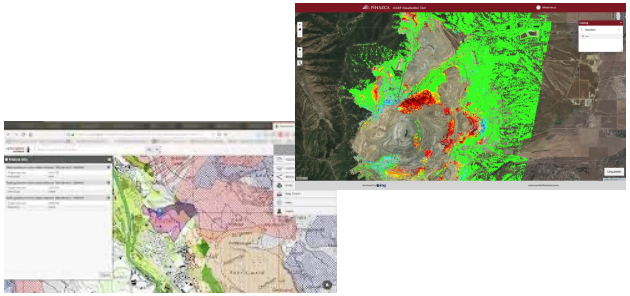
[O] IRIS | CHANGE DETECTION AND DISPLACEMENT ANALYSIS SOFTWARE

IRIS
Change Detection & Displacement Analysis Software



INSarPECT App

GIS interactive platform and tools



Visualization Tools

- Satellite InSAR
- Terrestrial InSAR
- PhotoMonitoring™

QGIS PS-Toolbox
Vectorial decomposition
Interferometric sections

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TRAINING

10TH ICGSM

INTERNATIONAL COURSE ON GEOTECHNICAL AND STRUCTURAL MONITORING

11-14 JUNE 2024 | GOLDEN (CO) UNITED STATES

In 2024 the International Course on Geotechnical and Structural Monitoring (ICGSM) will celebrate the 10th Anniversary Edition with a special event in the country where the idea of ICGSM was discussed for the first time by John Dunnicliff and Prof. Paolo Mazzanti.

Since 2014, ICGSM is recognized as "not-to-miss event" representing a unique network and training opportunity for the professional, academic and industrial world of geotechnical and structural monitoring with the participation of leading international experts and exhibitors in a large EXPO area.

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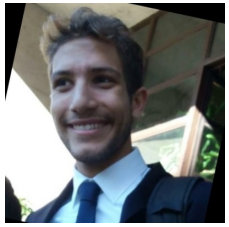
Univ. Sapienza
Geologist

Univ. Firenze
Environmental Eng.

Univ. Sannio
Geologist

Univ. Sapienza
Physicist

Univ. Sapienza
Geologist



Univ. Sapienza
Data scientist

Univ. Urbino
Geologist

Univ. Pisa
Civil Engineer

Come si è evoluto il seme inziale da cui ha avuto inizio Nhazca?

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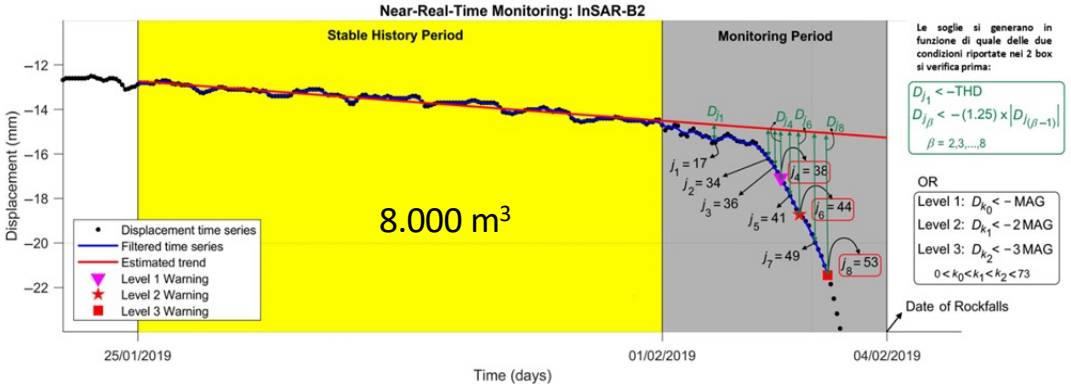
CROLLI IN ROCCIA PER FINALITÀ DI ALLERTAMENTO… UN ESEMPIO DI COMPLESSITÀ



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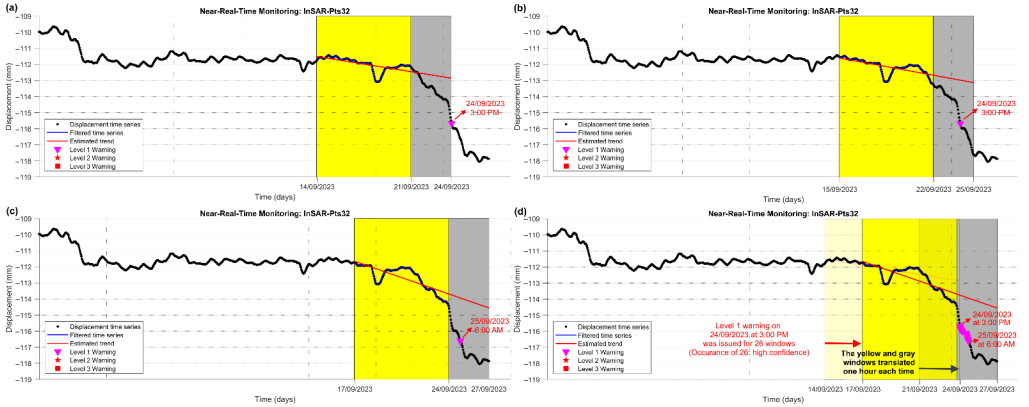

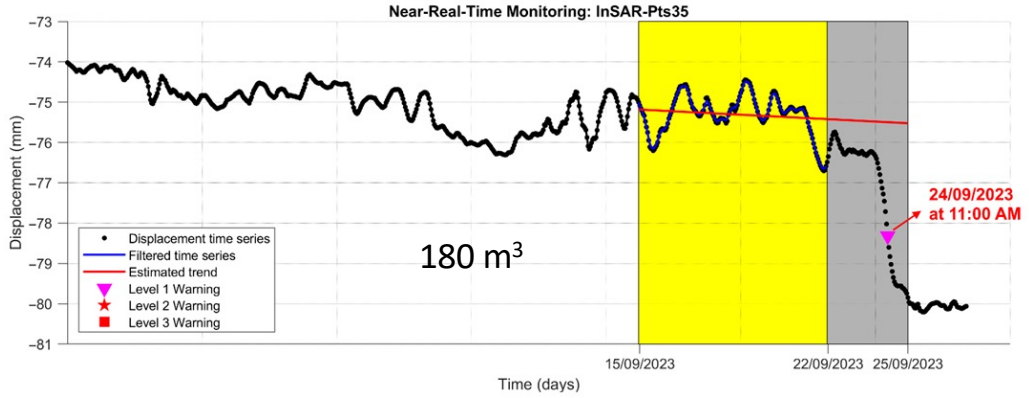

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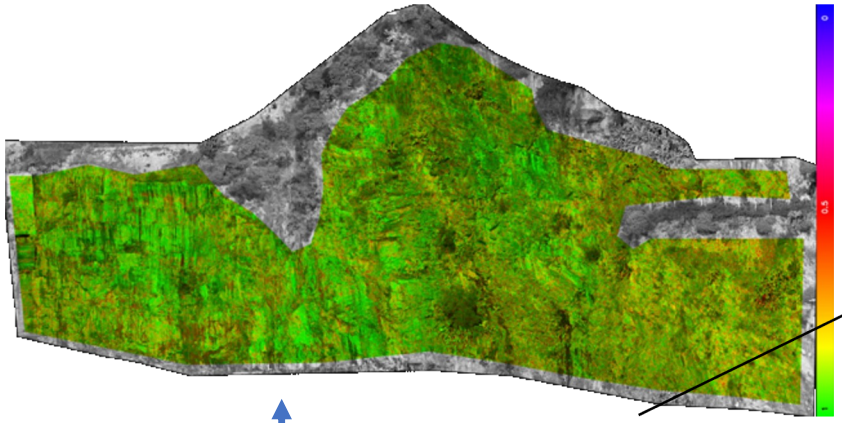
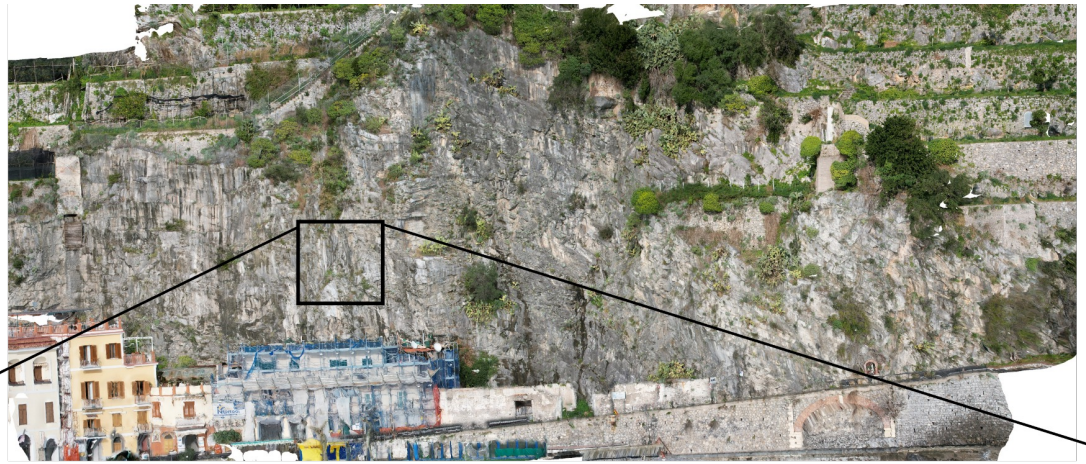
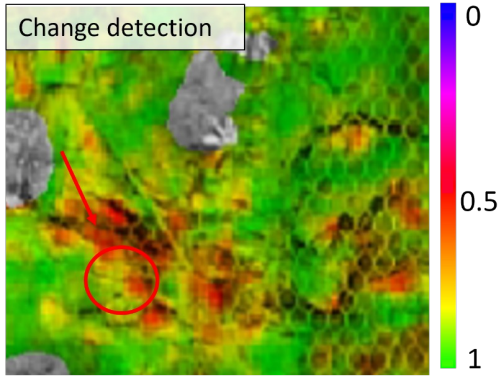
MONITORAGGIO CROLLI IN ROCCIA CON Ddroni





Analisi dei cambiamenti per la parete rocciosa di Minori



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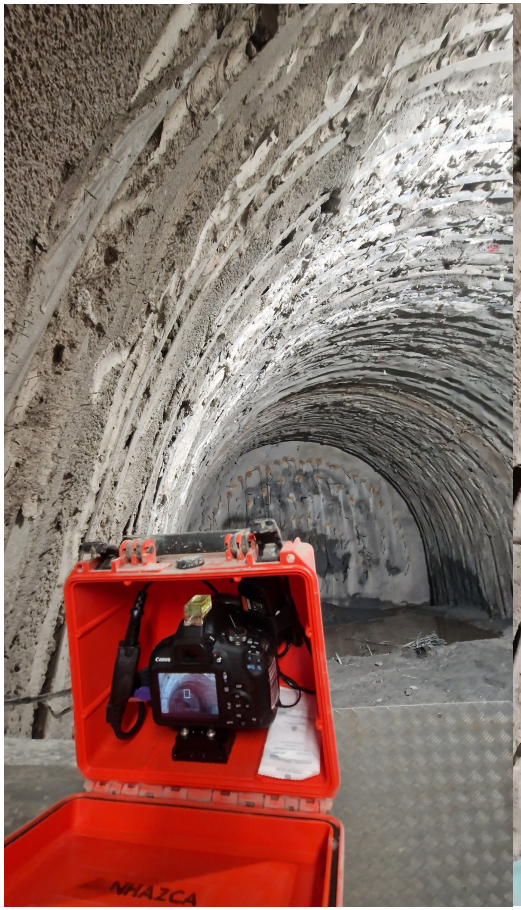
CONTROLLO DELLE GALLERIE IN FASE DI SCAVO



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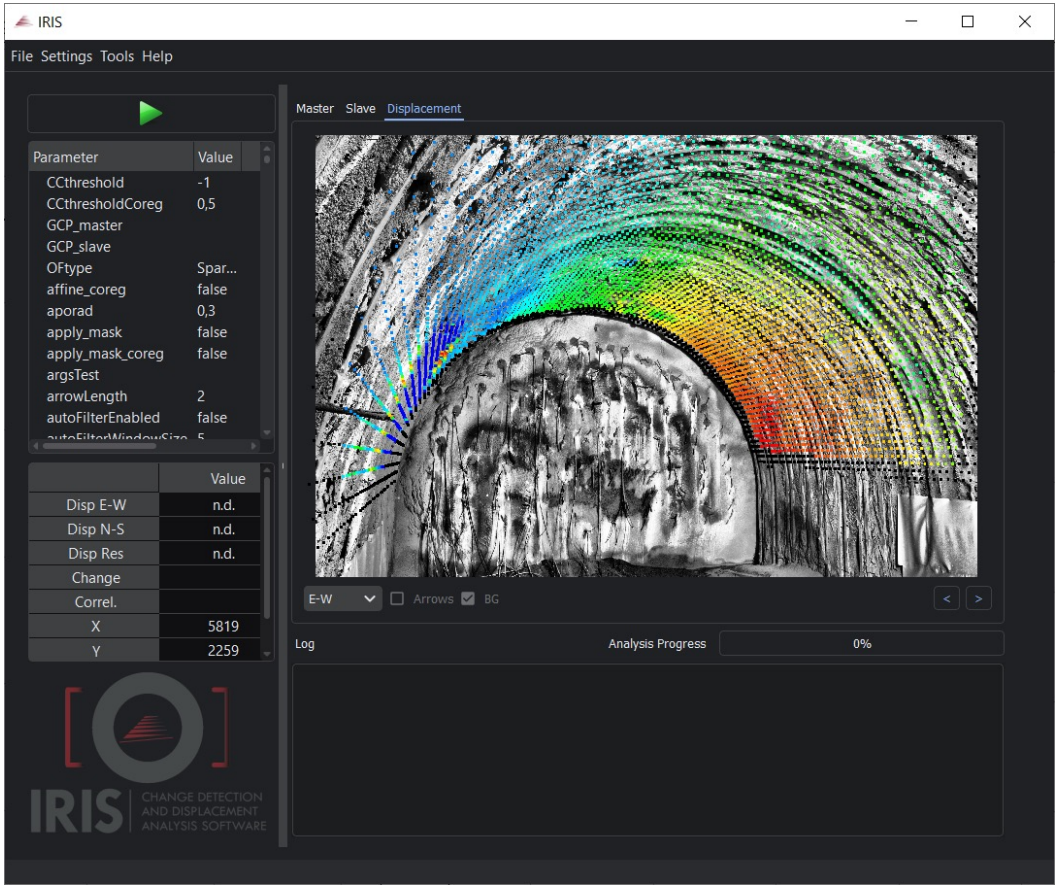
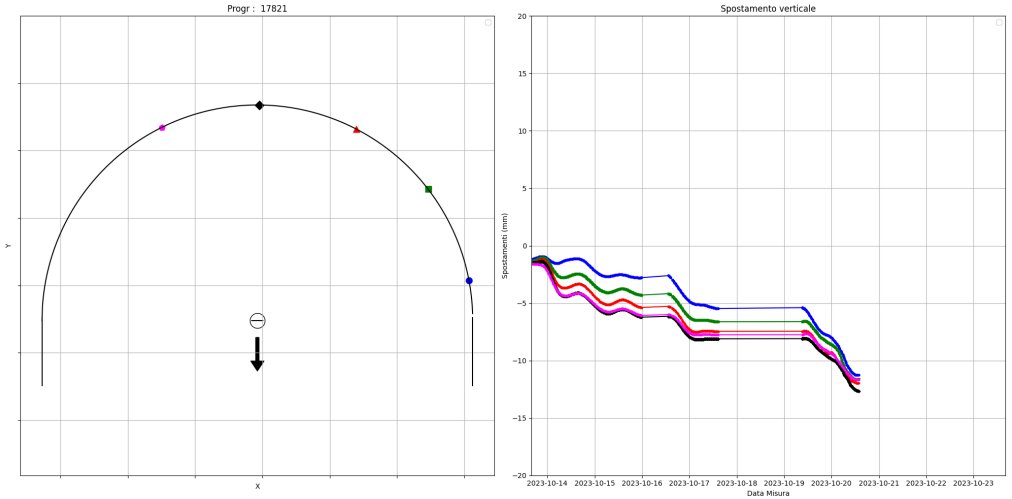
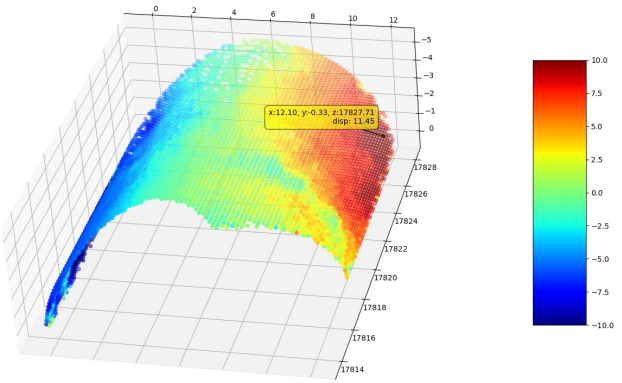
CONTROLLO DELLE GALLERIE IN FASE DI SCAVO







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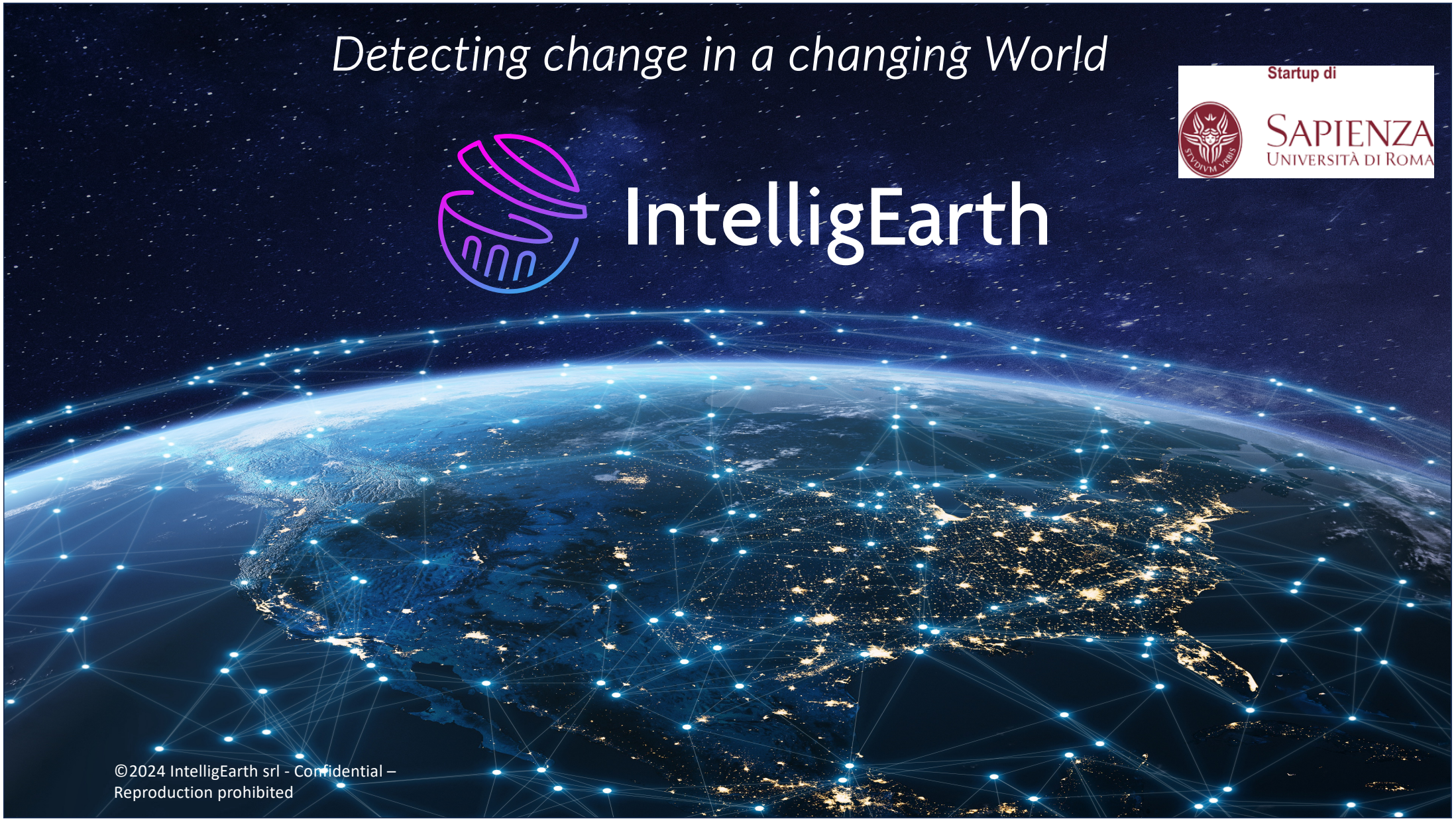

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VISION

At IntelligEarth, we envision a future where our innovative tech solutions redefine global efforts in preserving and protecting our planet. By weaving together, the threads of crowdsourcing, AI, and immersive technologies, we are dedicated to forging a resilient and sustainable world. Join us in shaping an intelligent, greener, and interconnected future.

MISSION

We are developing cutting-edge, user-friendly technologies, drawing inspiration from space applications, for the timely monitoring of cultural and environmental heritage by taking advantage of crowdsourcing and artificial intelligence to make monitoring of cultural and natural heritages accessible, systematic, cost-effective, and socially engaging.

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