

We observe the world
from another perspective



Startup of
SAPIENZA
UNIVERSITÀ DI ROMA

 **NHAZCA**
NATURAL HAZARDS CONTROL AND ASSESSMENT

NHAZCA: A SUCCESS STORY

When I'm asked to describe "What NHAZCA is", my first thoughts go to our history. A dream to transfer academic innovation to real market needs as a successful example of the so-called "Third Mission".

NHAZCA has always been concerned with the safety of land, environment and infrastructure when few people were.

NHAZCA has been the link between space technology for Earth Observation and Terrestrial solutions. NHAZCA is committed to deliver outstanding results even when not specifically requested by the client.

Today NHAZCA is an internationally recognised technological brand, with a strong geological background and consolidated links with the research community.

Based on an amazing mix of technical skills, know-how and scientific references, NHAZCA is constantly exploiting new technologies to make complex data understandable for everyone.

Our motto is "Turning data into actionable information".

Alessandro Brunetti

Managing Director

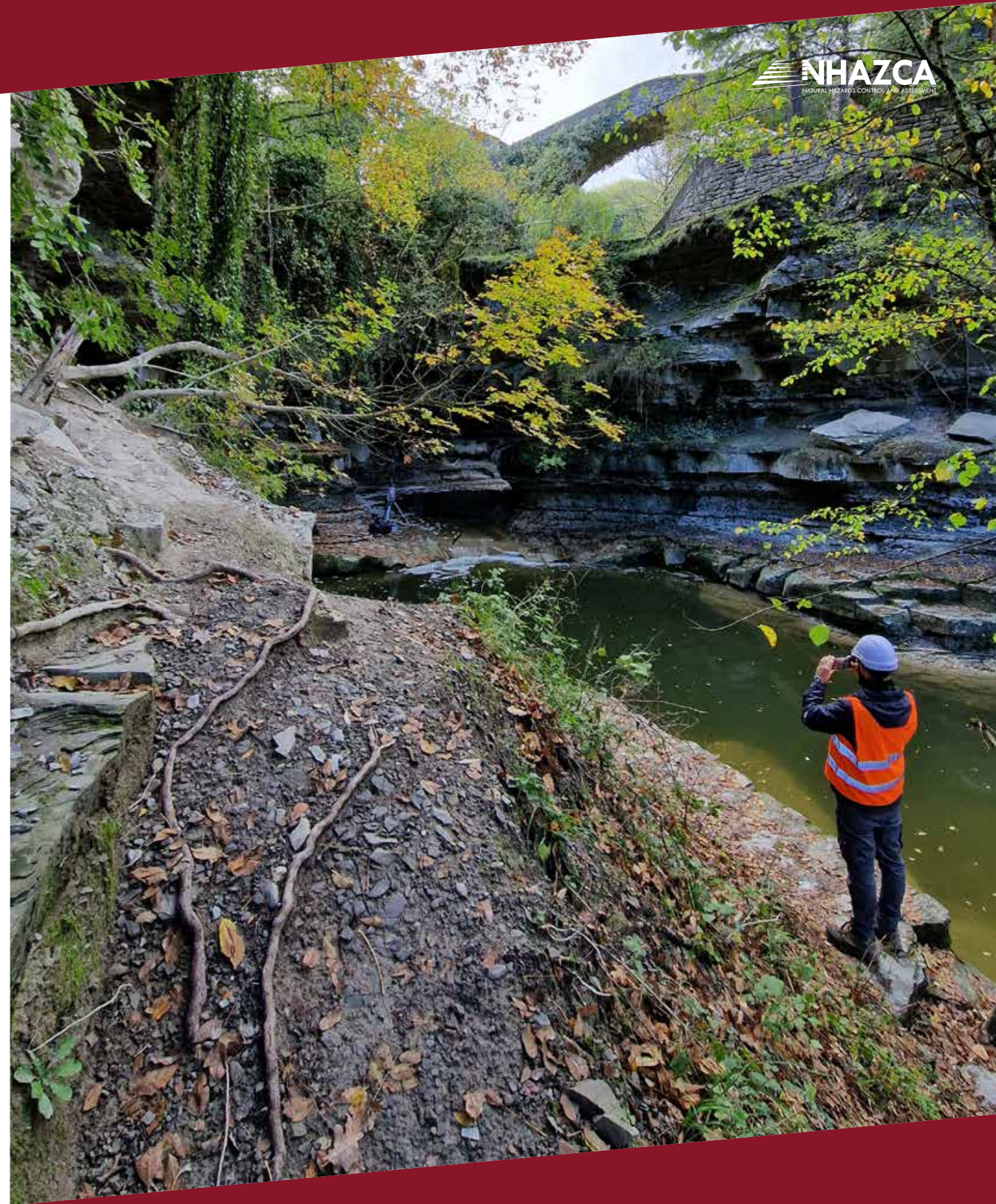
ABOUT US

NHAZCA (Natural HAZards Control and Assessment), a Sapienza University of Rome start-up, is an international leader in geohazard assessment and monitoring solutions for the management and control of natural and built environments.

NHAZCA is a fast growing company, thus confirming the extraordinary performance based on high-quality services, reliability and customer satisfaction.

Innovation, scalability of services based on terrestrial, aerial and space assets, and relevant positioning at national and international level in the management and construction of structural and infrastructure assets are the key success factors of NHAZCA.

Our **team members** have University degrees, with a strong engineering and geological background combined with solid expertise in Earth Observation and remote sensing technologies. NHAZCA is supported by established industrial and academic partnerships that enable continuous innovation and the development of new solutions.



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.

NHAZCA: INTERNATIONAL LEADER IN GEOTECHNICAL AND STRUCTURAL MONITORING



High-level consultancy

on complex projects

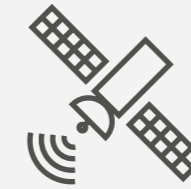


More than 450 customers worldwide



First "fully remote" company

unique cross-proposition based on the full range of remote sensing technologies



> 80 projects

based on satellite images (optical, radar, multi-spectral)



> 800 people

trained in geotechnical and structural monitoring



Multidisciplinary team



Customer-centric approach

our motto is "Turning data into actionable information"



100% graduated staff



Innovation-driven company

owner of technological solutions and Trademarks (PRIMO, Photomonitoring)



Strong academic links

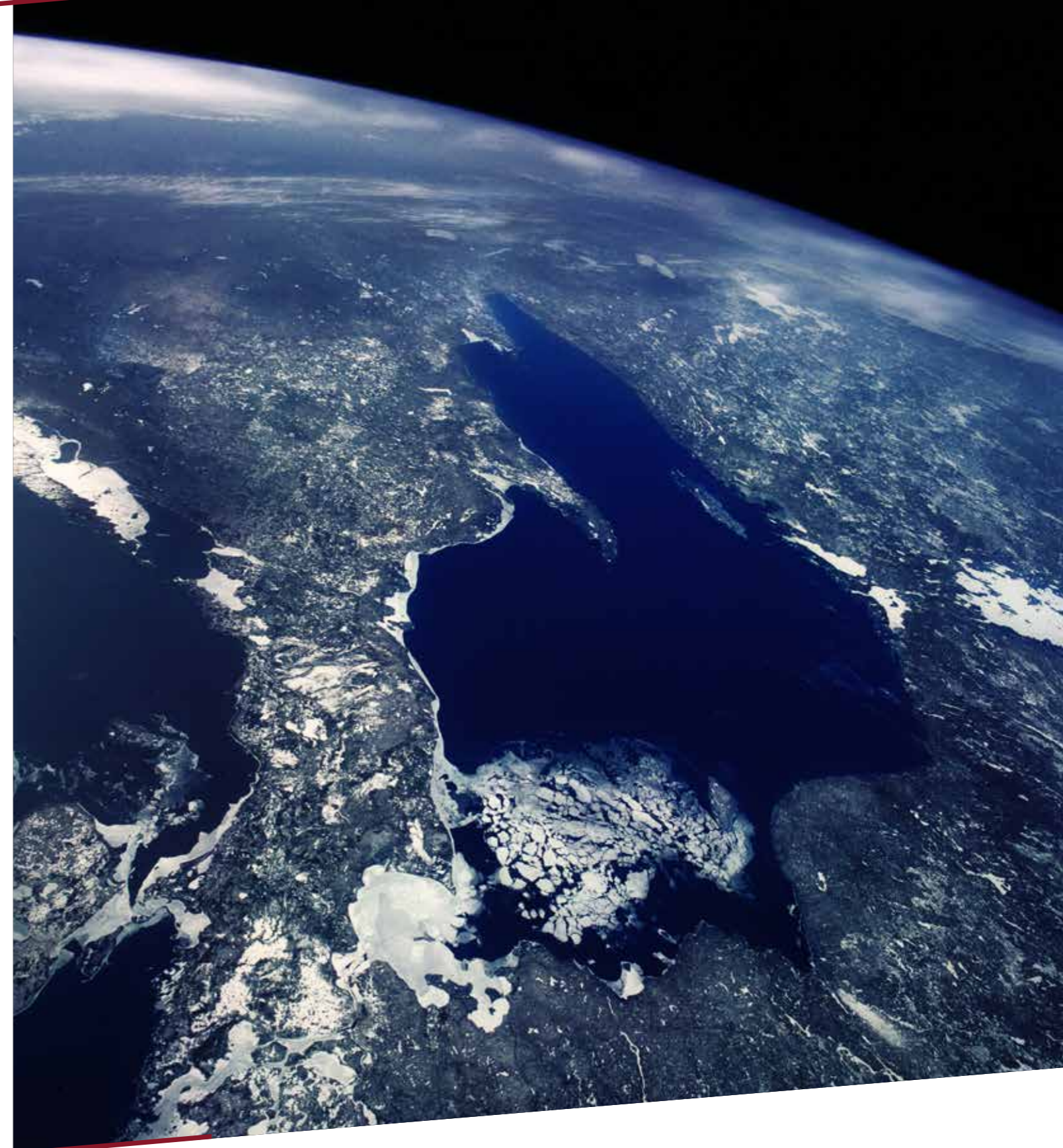
constant investment in R&D projects

OUR HIGH-TECH SERVICES: MONITORING INNOVATION

The services provided by NHAZCA are a combination of research, high technology and maximum effectiveness in implementing solutions.

NHAZCA is a reliable partner, capable of identifying the best strategic and technological solutions in the field of risk analysis and monitoring. This is possible thanks to the company's know-how and the long experience gained in working on projects aimed at protecting land, infrastructure, cultural heritage and people.

NHAZCA offers specialised consultancy services aimed at assessing and mitigating geohazards, supporting land planning, enabling smart design & management of strategic assets, ensuring the safety of citizens and the collective architectural and cultural heritage.



GROUND MOTION MAPPING

Ground Motion Mapping allows the identification, understanding, analysis and prediction of ground movements related to natural or anthropogenically induced geological phenomena.

Thanks to Ground Motion Mapping, it is possible to investigate the history of a geological phenomenon, understand its evolution over time and predict possible future changes.

This is fundamental to improve land planning and mitigate possible risks.

Several conventional and advanced technologies are used to perform the analysis, such as Satellite Interferometry, Terrestrial Interferometry and Terrestrial & Satellite Photomonitoring™.

HIGH-LEVEL TECHNICAL-SCIENTIFIC CONSULTANCY

NHAZCA provides high-level technical-scientific consultancy for geological, geomorphological and geotechnical analysis to support geological risk assessment.

Our services can be included in multidisciplinary projects finalised to land planning, landslide geological modelling, preliminary geohazard assessment for large infrastructure design (e.g. pipelines, transport corridors, reconstruction works after catastrophic events).

The service can potentially cover the entire project cycle, from design to construction and safety management during operations.



STRUCTURAL HEALTH MONITORING

Structural Health Monitoring (SHM) consists in the assessment of the static and dynamic behaviour of infrastructures over time based on data-driven or model-driven approaches.

The purpose of SHM is to evaluate the safety, efficiency and durability of structures using advanced continuous monitoring technologies.

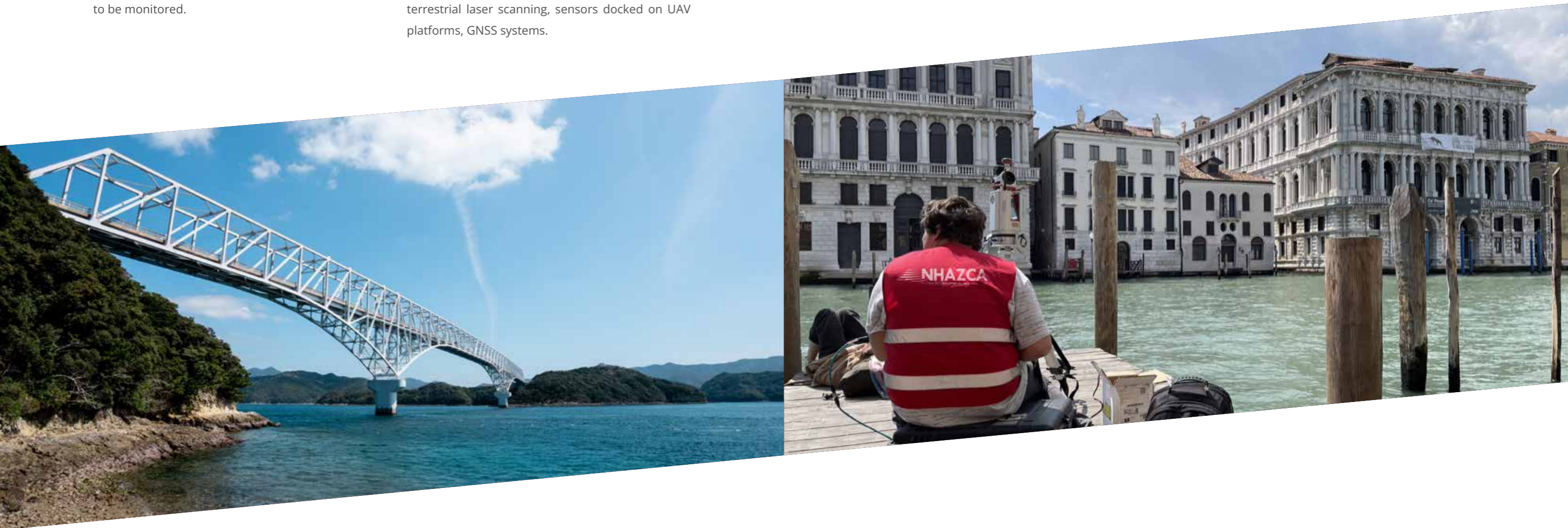
A number of methodologies can be applied in SHM based on the geotechnical and physical parameters to be monitored.

The value proposition of NHAZCA in SHM lies in the application of innovative technologies that allow the historical characterisation of large infrastructure networks, the rapid intervention in case of emergency and the periodic inspection based on quantitative data enabling a non-invasive intelligent asset management.

The key technologies used by NHAZCA for SHM are: terrestrial and satellite SAR interferometry, terrestrial RAR interferometry, Photomonitoring™, terrestrial laser scanning, sensors docked on UAV platforms, GNSS systems.

“Every instrument on a project should be selected and placed to assist with answering a specific geotechnical question: if there is no question, there should be no instrumentation”

(John Dunicliff, 2017)



SGAM Smart Geotechnical Asset Management

SGAM (Smart Geotechnical Asset Management) is a service developed by NHAZCA that focuses on the risks affecting structures and infrastructures, analysing their interaction with the local geological and environmental context enabling predictive maintenance of assets.

Through a process of smart automatic classification, the service assesses the direct or potential future impact of geohazards such as landslides, floods, sinkholes, etc.

The service helps decision makers and asset managers to define and prioritise maintenance activities based on asset vulnerability and loss scenarios (risk-based management).

This is achieved by integrating a large amount of historical and newly acquired data through a data fusion approach that combines information from space industry, global and regional geodatabases, data collected from field surveys or ground-based structural health monitoring systems, and geotechnical/geomorphological monitoring systems.



PRIMO™ PRompt Intervention MOnitoring Protocol

PRIMO™ (PRompt Intervention MOnitoring Protocol) is a registered trademark developed thanks to NHAZCA know-how for the deployment of emergency monitoring solutions in less than 48 hours.

PRIMO™ enables asset owners and emergency managers to obtain quantitative and detailed information on geohazards and processes that affect key assets (e.g. roads, tunnels, railways, dams) to support resilient infrastructure management.

PRIMO™ is combined by a 24/7 monitoring system, connected to decision makers, alerting for any change in the overall situation and supporting intervention prioritization.

Various remote sensing technologies can be used in an emergency situation, such as TInSAR based on radar imagery, Photomonitoring™ based on standard cameras, laser scanners, UAVs.



TESTIMONIALS

MARCO RETTIGHIERI



Board of Directors Chairman, Webuild

"NHAZCA employs a multidisciplinary approach supporting both geotechnical and engineering aspects in each project. The team was able to adapt to complex challenges, suggesting valuable and innovative solutions where technologies and conventional approaches were not applicable".

CHRISTIAN KANU



Chief Executive Officer, Generali Global Corporate & Commercial.

"Risk Engineering & Loss Prevention, together with Underwriting and Claims, have always been about expert data management and our industry is now on the verge of becoming even more science based. Thanks to the collaboration with NHAZCA, GC&C strengthens its ability to meet the most sophisticated clients' insurance needs, by further preventing and mitigating their risk exposures and enhancing cost-effectiveness in the insurance coverage".

HERVÉ JOURQUIN



Branch & Deputy Project Manager, BESIX

"NHAZCA provided us with actionable information based on ad-hoc innovative solutions and tailored services, allowing us for an effective decision making in the management of our working sites, even in complex situations"-

FRANCESCA SPATARO



ROSE-L Program Director, Thales Alenia Space

"NHAZCA supported Thales Alenia Space Italia in the assessment of the ROSE-L* Mission Requirements, from the point of view of expert users of Earth Observation products, providing valuable insights and suitable information, demonstrating an outstanding capability in the understanding of our needs.

**Programme of the European Union Copernicus co-funded with ESA".*

PROF. ANNA DE FALCO



Associate Professor PhD, Department of Civil and Industrial Engineering (DICI) Structural Div., University of Pisa.

"NHAZCA has been synonymous of technology excellence with its ability of combining different methodologies according to the needs of cultural heritages managers. NHAZCA team distinguishes itself for its great support and openness in explaining in detail the obtained results".



OUR FLAGSHIP PROPRIETARY TECHNOLOGIES

PHOTOMONITORING™ & IRIS SOFTWARE

PhotoMonitoring™ is a registered trademark developed by NHAZCA. This methodology is an innovative fully remote sensing technique for the analysis and control of land, structures and infrastructure by comparing images acquired at different times.

PhotoMonitoring™ has been created in response to the growing need for real-time and low-cost monitoring solutions, allowing the analysis of any source of images acquired by different sensors and platforms. The technique is applicable over different time scales and supports the assessment and monitoring of a wide range of processes that may affect

the areas under investigation.

PhotoMonitoring™ is based on a set of advanced image processing algorithms (e.g. digital image correlation and change detection) implemented in the IRIS software developed by NHAZCA.

The technique is designed to work with terrestrial, aerial and satellite imagery (optical, thermal, near-infrared, radar,...), allowing sub-pixel accuracy in displacements monitoring.

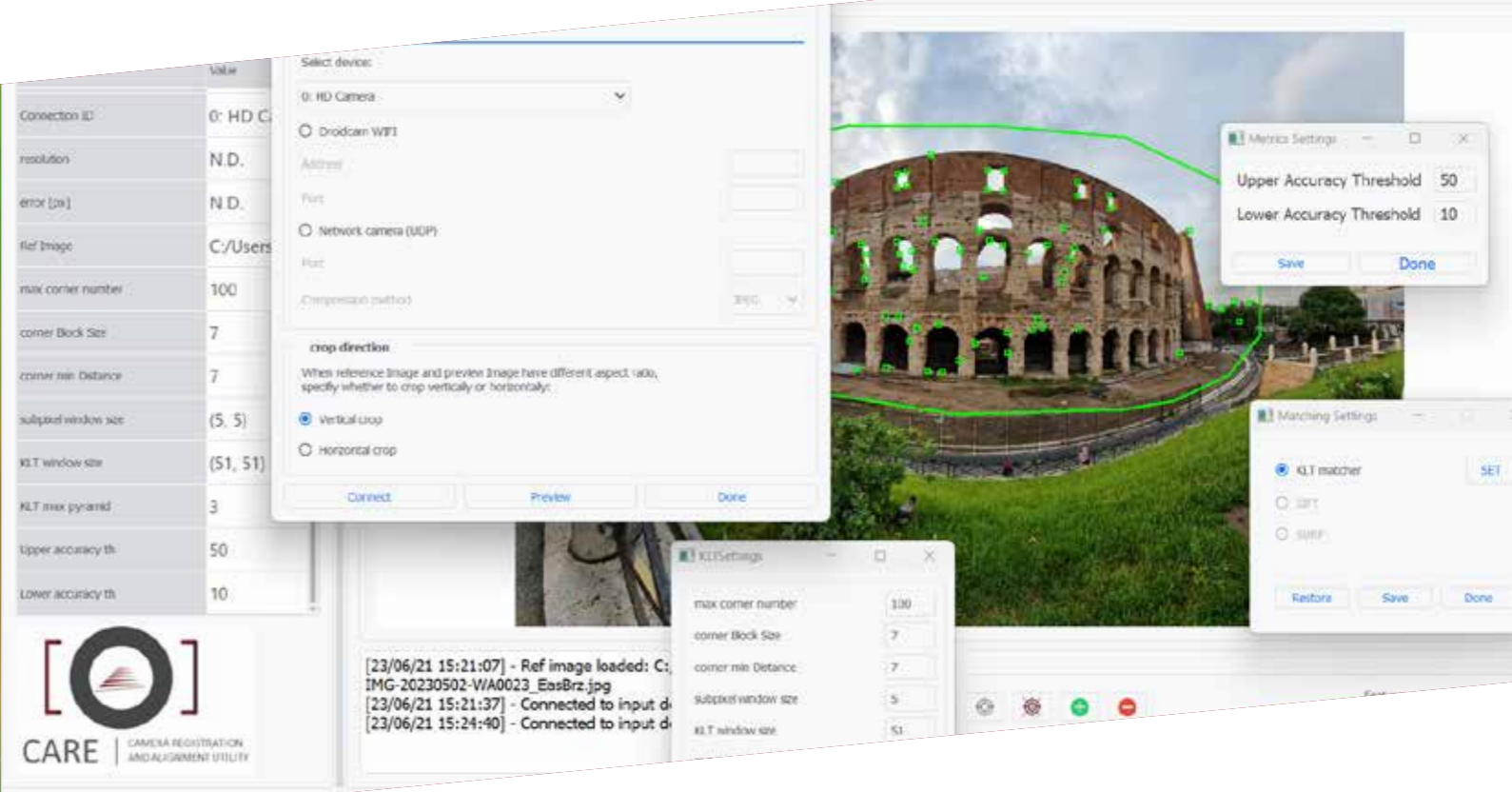
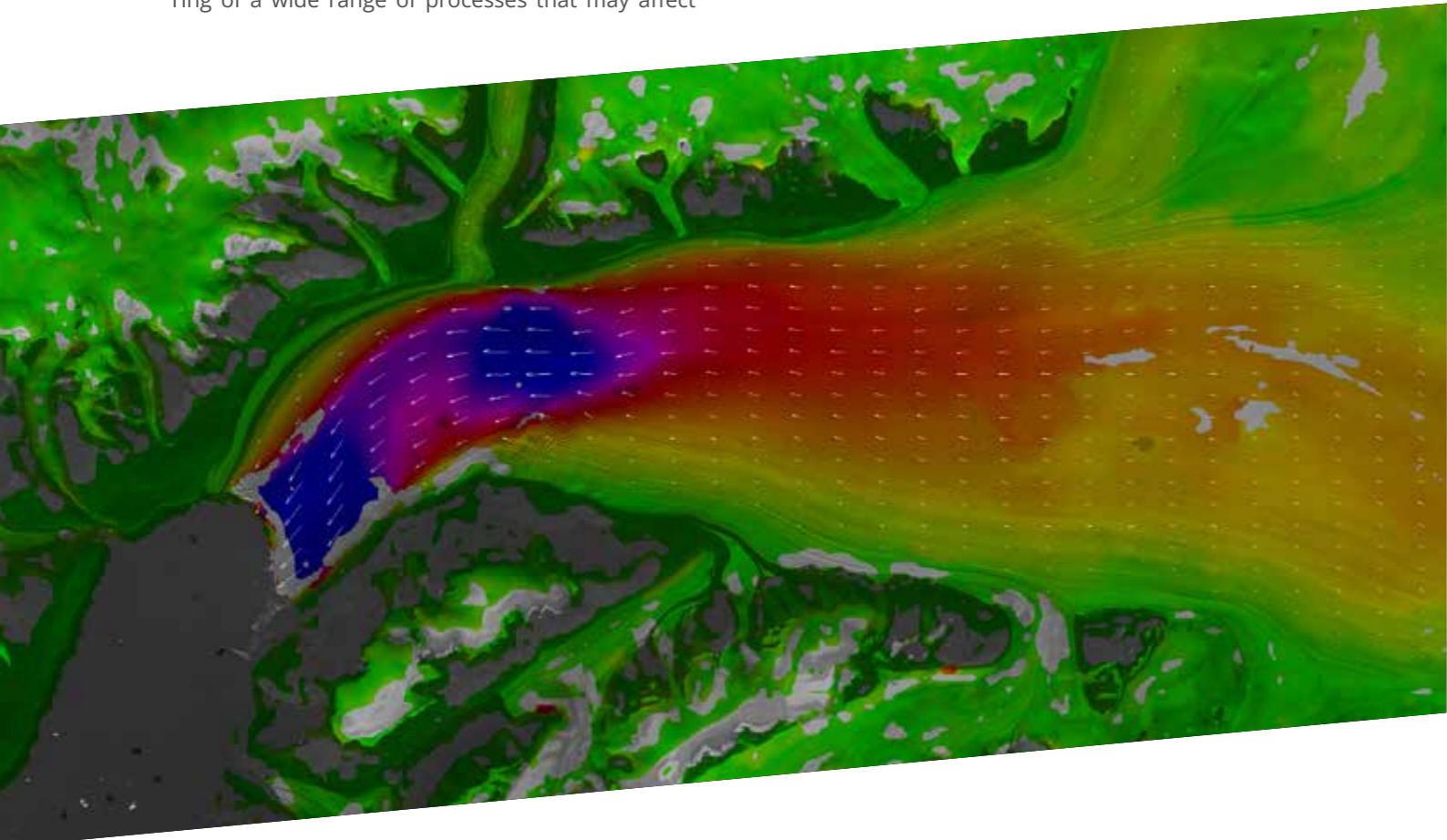
CARE

CARE is an innovative system designed and developed by NHAZCA to provide low cost periodic photo-monitoring surveys where the installation of permanent monitoring systems is not possible.

CARE's technology allows for precise repositioning of the photographic sensor, minimising processing errors and ensuring unparalleled reliability of results.

CARE is designed to work with any type of camera, from industrial sensors to smartphones.

CARE is designed to work with any type of camera, from industrial sensors to smartphones and represents a suitable and reliable tool for periodic inspections of land and structures.



PS TOOLBOX

PS Toolbox is a set of GIS plug-ins developed by NHAZCA for the interpretation and post-processing of ADInSAR data.

The tool addresses the need for a comprehensive information layer to support decision makers by providing accurate mapping and interpretation of detected deformation processes for evaluating the health status of structures and infrastructures, associated potential risks and maintenance requirements.

In particular, PS Toolbox:

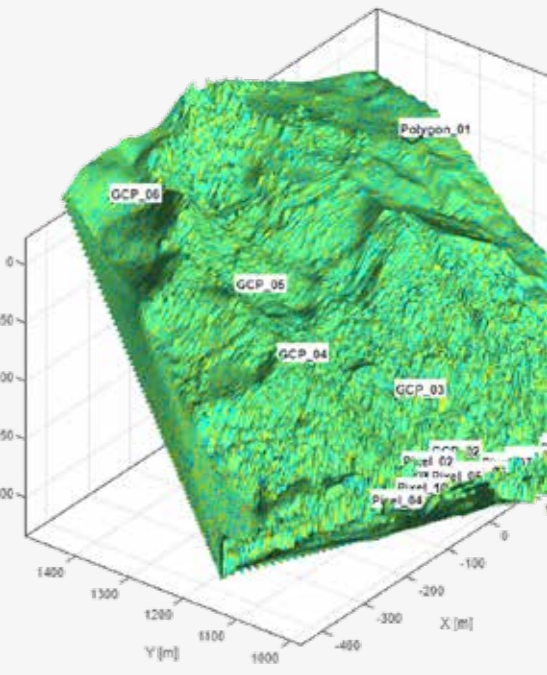
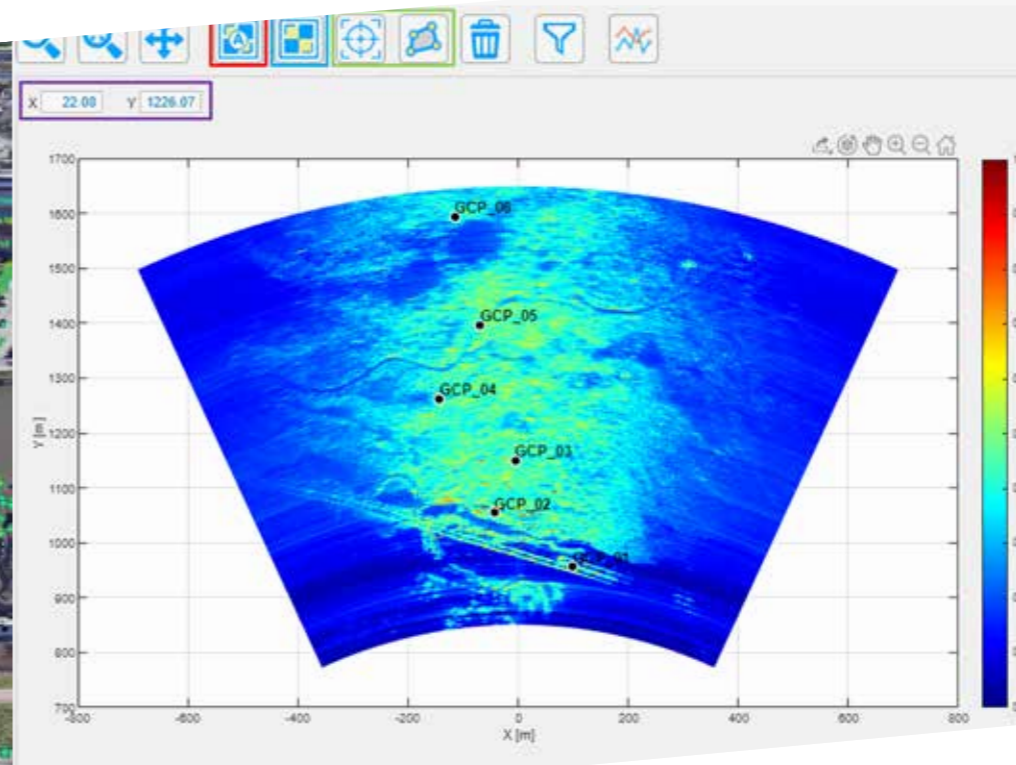
- ❑ Employs validated methods to facilitate the interpretation of displacements and their effects on infrastructure
- ❑ Combines interferometric data from SAR sensors with advanced data fusion algorithms to enhance spatial information and provide warnings when fixed thresholds are exceeded
- ❑ Transforms data into easy-to-interpret maps, available in 3D in Google Earth for improved readability



TRIVIA

TRIVIA (Terrestrial Radar Interferometry Visualization and Analysis) is the result of over 10 years experience in SAR interferometry. Equipped with a user-friendly interface, the software has been developed to facilitate the analysis of Terrestrial SAR images that are otherwise difficult to interpret.

The software is capable of performing advanced analysis of Terrestrial SAR images, processing data in real-time from multiple radar manufacturers, allowing for real-time automatic analysis (including an early warning module) and stand-alone advanced manual analysis.



NHAZCA, STAR OF ESA IRIDE PROGRAMME

NHAZCA, from a spin-off of Sapienza University of Rome to a leading player in the IRIDE programme services segment for land control and emergency management.

NHAZCA is part of the winning team of the IRIDE System Development programme, managed by the European Space Agency (ESA) with the support of the Italian Space Agency (ASI), which will be completed by 2026.

In particular, NHAZCA, in a group led by e-GEOS (ASI/Telespazio Company) and in collaboration with

other important partners, will give its contribution supporting the Ground Motion and Emergency service thematic domains.

NHAZCA's active participation in the IRIDE Service Segment programme represents a unique opportunity to support communities and public administrations with more than ten-years industrial research aimed at safeguarding and protecting land, infrastructures and cultural heritage, with more than ten-years industrial research aimed at safeguarding and protecting land, infrastructures and cultural heritage.

NHAZCA FOR CULTURAL HERITAGE

NHAZCA takes care of the inestimable Italian cultural heritage.

The Colosseum in Rome, the Leaning Tower of Pisa, the Venice bell towers and some of the beautiful monuments characterizing the historical centre of Florence, are among the UNESCO sites addressed by few of the most relevant NHAZCA projects.

Multiple technologies have been applied and new innovative multidisciplinary methodological approaches based on data fusion and redundancy have been proposed ad-hoc and experimented in order to support the Authorities in the assessment of the "state of health" of heritages and in their protection from natural hazards, based on a preventive and predictive maintenance.



NHAZCA IS PASSION, COMMITMENT AND ADVANCED TRAINING

NHAZCA, in collaboration with professional bodies and associations in Italy and abroad, promotes highly professionalised training courses focused on geotechnical and structural monitoring, remote sensing applications and support for land planning and design.

The courses are designed to keep professionals up to date with the technological innovations and cultural developments that characterise the sector. Over the last 10 years, the courses have attracted more than 800 participants from over 50 countries and 60 companies.

Since 2014, the International Course on Geotechnical and Structural Monitoring (ICGSM) has been recognised as the key event in the corporate training agenda, providing a unique networking and discussion opportunity for the professional, academic and industrial world of geotechnical and structural monitoring, with the participation of leading international experts and exhibitors.

EXPLORING THE DEPTHS OF INNOVATION WITH OUR R&D UNIT

Innovation means constantly evolving to meet the challenges of the future. Since its foundation, NHAZCA has been focused on creating an increasingly inseparable link between business and new technologies.

Following this approach, NHAZCA constantly invests in R&D and connections with scientific networks programming, designing, engineering and prototyping new methodologies and data analysis approaches

that are able to provide effective and intelligent management of land and infrastructure.

The team is involved in numerous research projects, including international ones.

Thanks to this philosophy, NHAZCA has always stood out on the national and international scene for its highly innovative character and pioneering attitude.



Picture from the 9th edition of the ICGSM an international event on geotechnical and structural monitoring.

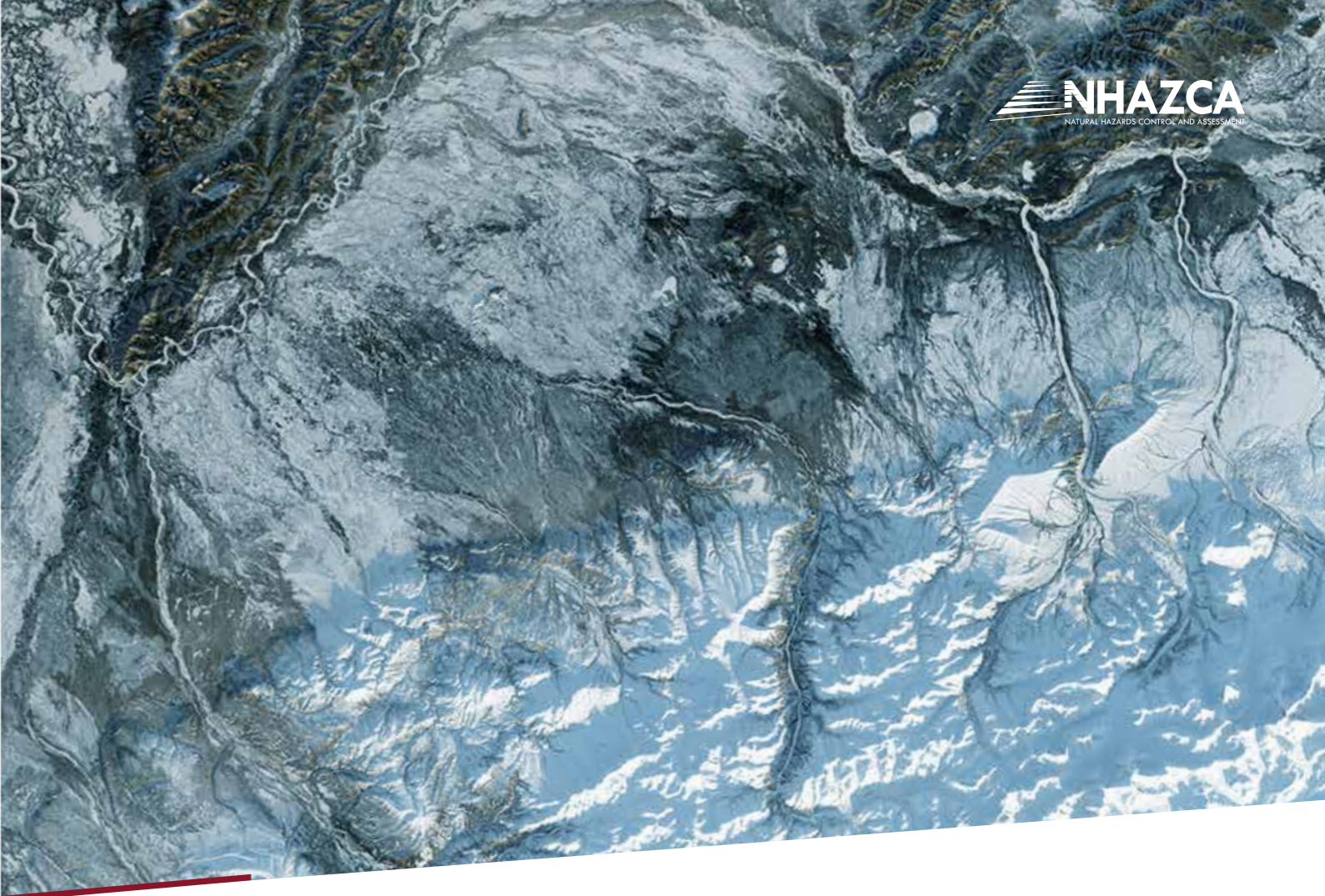


QUOTES FROM THE CO-FOUNDERS

Prof. Paolo Mazzanti

NHAZCA Co-Founder

“NHAZCA has been built on the key values of innovation and excellence promoting the relevance of monitoring for sustainable constructions and for guaranteeing our safety and the safety of our planet. Today, after 14 years of hard work with an incredible team, this is the core value of the company. NHAZCA is a recognized and benchmark entity at national and international level for the application of innovative monitoring technologies and I'm so proud to see today its positive impact in the society.”



Prof. Francesca Bozzano

NHAZCA Co-Founder and President

“NHAZCA: a successful example of academic entrepreneurship!
NHAZCA was born in 2009 as spin-off company of Sapienza University of Rome achieving a virtuous technological transfer representing an important part of University “Third Mission”.
The R&D dedicated to geotechnical and structural monitoring represents an undeniable competitive advantage for the company, that is still strongly supported by its connections with the academic world”.

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