



**GEOCART S.p.A. - ENGINEERING COMPANY**



# GEOCART

ENGINEERING COMPANY

***Our applications in the fields of Earth Observation,  
Renewable Sources and Powerlines, Natural Risks  
Management, Civil and Infrastructural Engineering and  
Territorial and Environmental Monitoring***



**WE EXPLORE THE TERRITORY WITH THE TALENT OF OPEN INNOVATION PEOPLE**



## Who we are

GEOCART' staff is composed by qualified experts:

*physicists, geologists, environmental, territorial, mechanical, civil, electronics and hydraulic engineers, architects, forest experts, economists, IT experts, graphic designers, land surveyors, topographers, CAD and GIS operators.*



## Where we work



### PRESENT MARKETS

- **Europe:**
  - ☐ Italy
  - ☐ Poland
  - ☐ Estonia
  - ☐ Hungary
  - ☐ Serbia
  - ☐ Romania (*Hydro Geocart*)

### NEW OPENING MARKETS

- *Other European Countries*
- *Central Asia*
- *Middle East*
- *Africa (SADC)*
- *Latin America*



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## Certification

- Our Quality Management System, audited continuously by the Certification Organization Bureau Veritas, is conformed to the international rules and regulated by **UNI EN ISO 9001:2008**, in order to guarantee both the activities improvement and the products and services quality





## **GEOCART' Mission**

- Our main activities are the design, production and maintenance of **geographic data bases**.
- On the basis of our expertise and technologies, we provide services related to **aerial and terrestrial mapping** using traditional and innovative techniques besides **satellite image-processing**.
- The relevant “**know-how**”, gained by means of the earth observation and the technical interpretation of the acquired data, has allowed to diversify and enlarge the fields of application working for **environmental / civil engineering and renewable sources sector**.







## From supplier to partner!



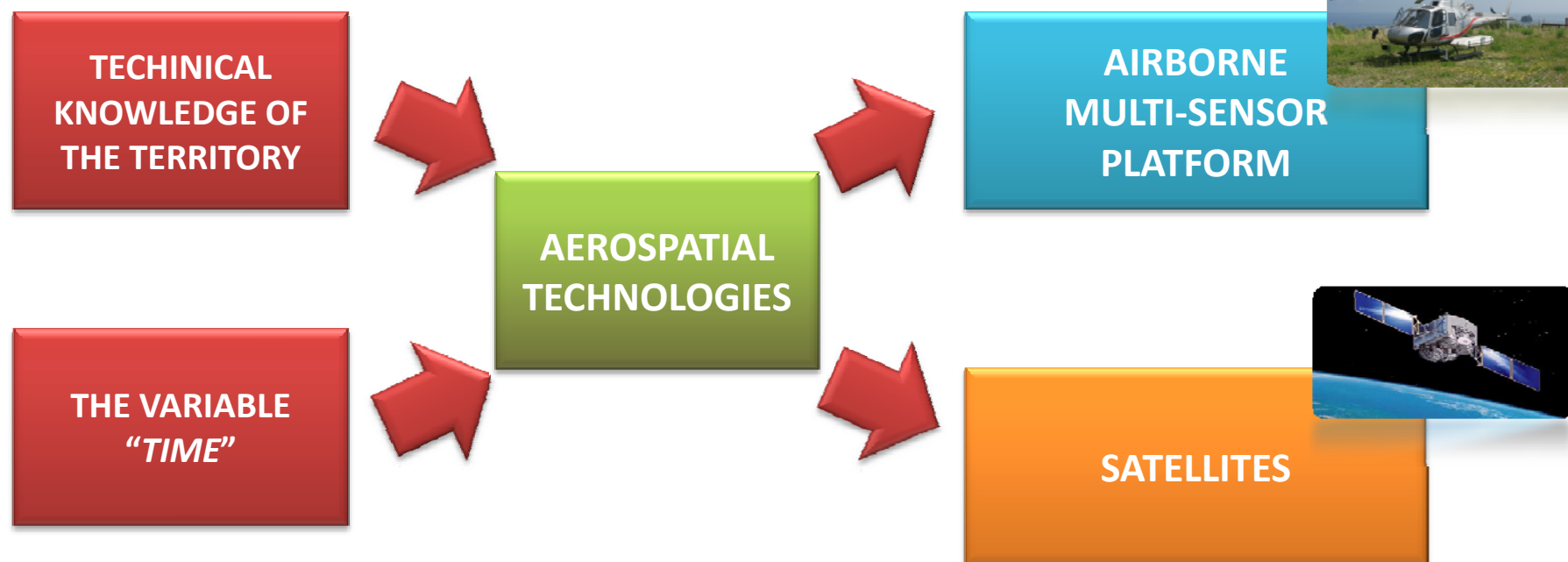
- ✓ ITALIAN MINISTRY OF ENVIRONMENT
- ✓ REGIONAL ENVIRONMENTAL PROTECTION AGENCY
- ✓ DEPARTMENT OF CIVIL PROTECTION
- ✓ BASIN AUTHORITIES
- ✓ ITALIAN SPACE AGENCY
- ✓ ENEL
- ✓ ITALFERR
- ✓ CTBTO
- ✓ SOGIN
- ✓ TOTAL
- ✓ A.N.A.S. INTERNATIONAL ENTERPRISE
- ✓ INARCHECK

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## Aerospatial Technologies

GEOCART uses **aerospatial technologies** in order to provide territorial data with *high precision* and in a *very short period of time*!





## **Geocart' Aerospacial Technologies**

### **MAPPING**

**AIRBORNE MULTI-SENSOR  
PLATFORM**



### **SLIDE**

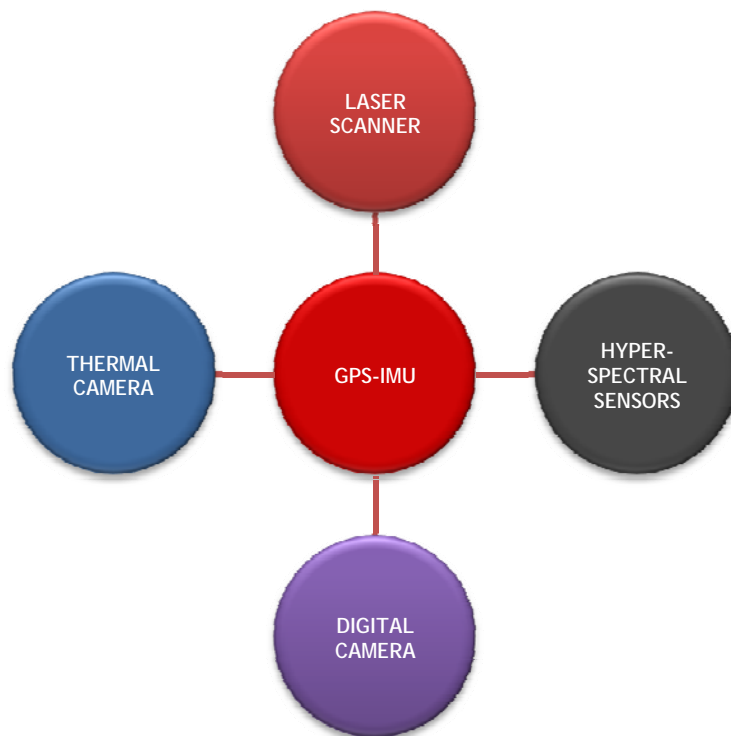
**SOFTWARE FOR SATELLITE  
DATA PROCESSING**



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## MAPPING AIRBORNE MULTI-SENSOR PLATFORM



**MAPPING** is an **airborne multi-sensor platform** installable both on **helicopter** and on **fixed wings aircraft**. The system, integrating a *full waveform laser scanner*, one or more high resolution *digital cameras*, a *digital thermo camera* and two *hyper-spectral sensors* operating in **VNIR** and in **SWIR**, allows to carry out territorial surveys of wide areas with high precision and in a very short period of time. The platform is **opened to the integration of other sensors**.







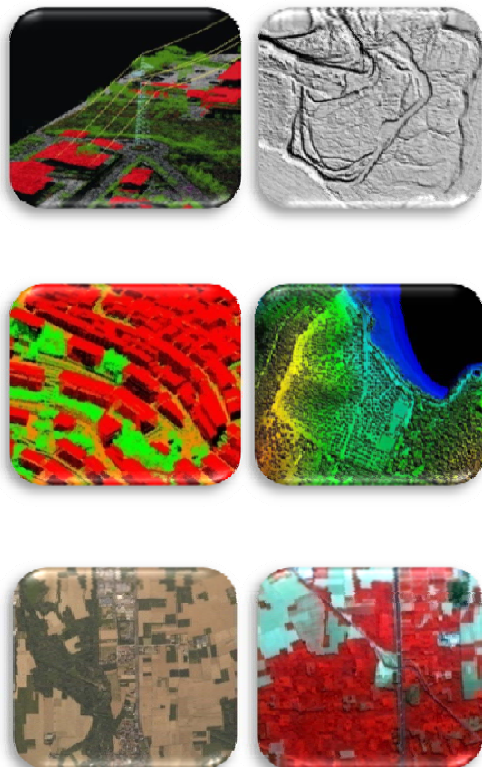
## MAPPING INSTALLATION ON HELICOPTERS OR ON FIXED WINGS AIRCRAFTS



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MAPPING *FINAL OUTPUTS*



## OUTPUTS

CLOUD POINTS

DTM & DSM

SECTIONS & PROFILES

ORTHOPHOTO

HYPER-SPECTRAL IMAGES

VECTORIAL THEMES

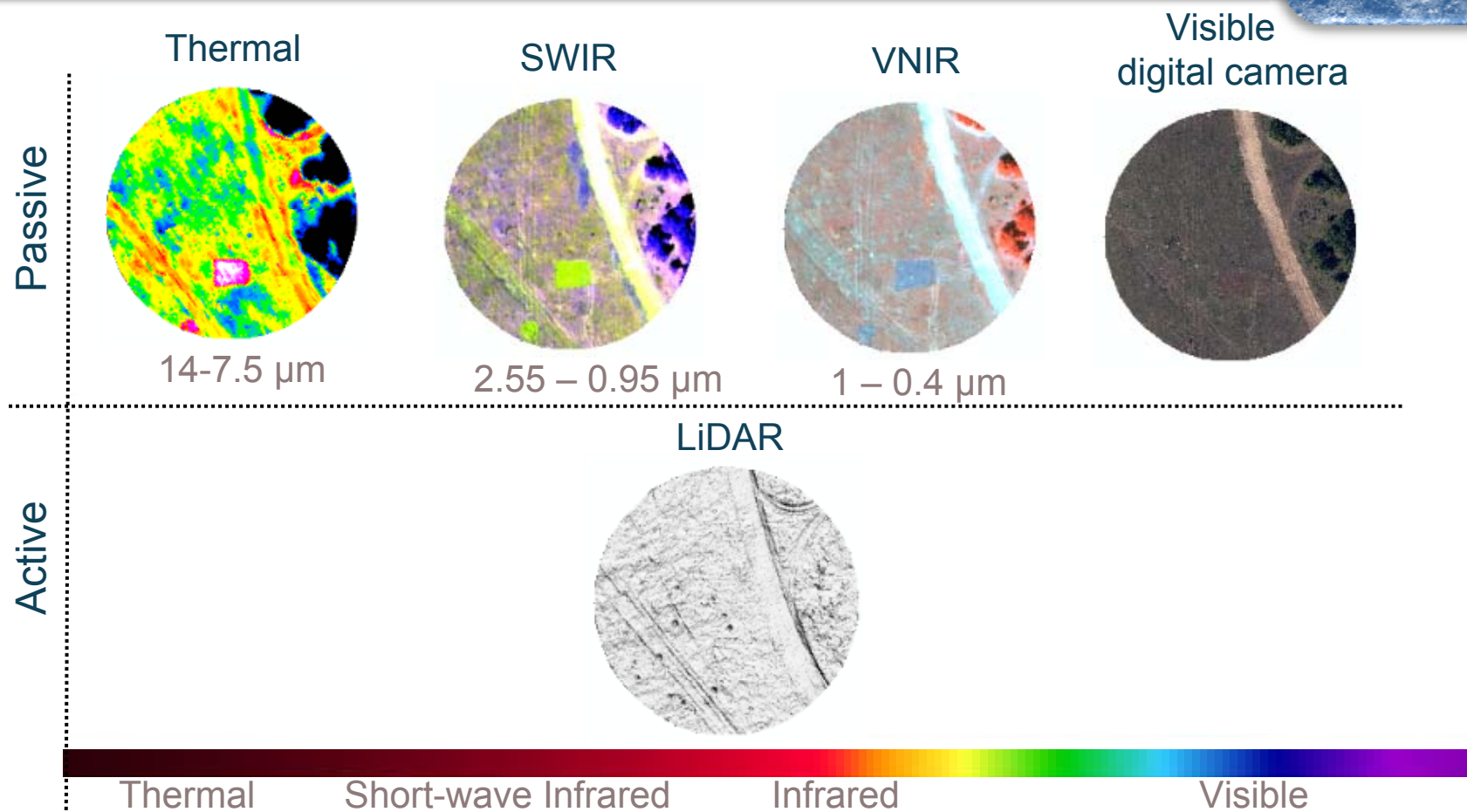
3D VIEWS & VIDEOS



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## MAPPING FINAL OUTPUTS

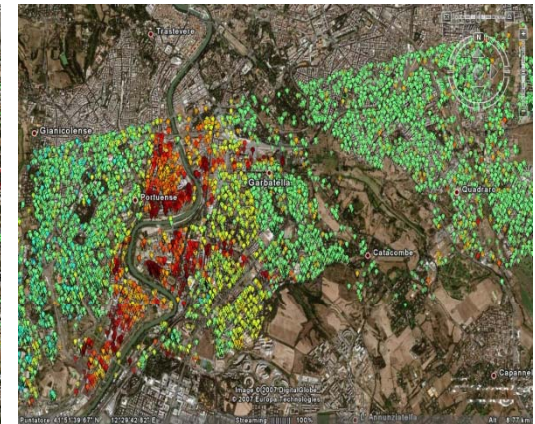
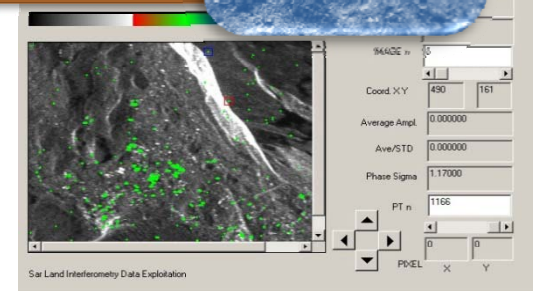






## SLIDE SOFTWARE FOR SATELLITE DATA PROCESSING

Following the applied research conducted for several years on **the techniques of differential SAR interferometry**, Geocart has developed a software application named “**SLIDE**”, acronym of **SAR Land Interferometry Data Exploitation**. This software aims to measure the **ground and infrastructures displacements** with highest precision, using SAR data coming from **satellites**. The analysis can be conducted on large scale monitoring the **wide regions**, or the **areas with a more limited coverage** up to the check of **singular buildings** in urban centres. By **SLIDE** it is possible to keep constantly under control the displacements relative to sites and structures such as **dams, bridges and other elements potentially subject to natural risks**.



### APPLICATIONS

- > MONITORING OF SUBSIDENCE PHENOMENA
- > MONITORING OF LANDSLIDE AREAS
- > CONTROL OF THE STABILITY OF INFRASTRUCTURES



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## Fields of Application







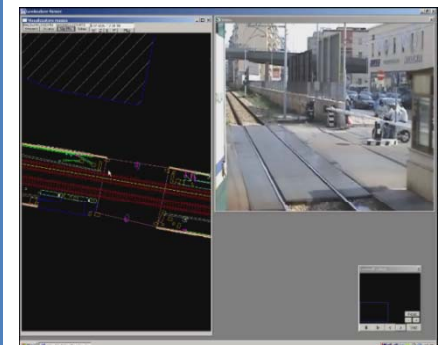
## MONITORING AND MAPPING OF INFRASTRUCTURES

### OUTPUTS



The **networks inspection service** is based on the **ground and aerial surveys** with georeferenced acquisition of videos and images related to infrastructures, technological and natural nets, using **CIRO system (Computer Integration for Remote Observation)**.

- > Identification, in real time, of networks anomalies
- > Carrying out digital cartography and network drawings updating
- > Congruity verification of components position represented in network graphs with respect to the real positions
- > User friendly queries about data acquired and navigation, on GPS trace, images and videos of the networks using software GeoAnalyzer
- > Data transfer of surveyed networks anomalies to the palmtops.





## MONITORING AND MAPPING OF INFRASTRUCTURES

## Powerlines

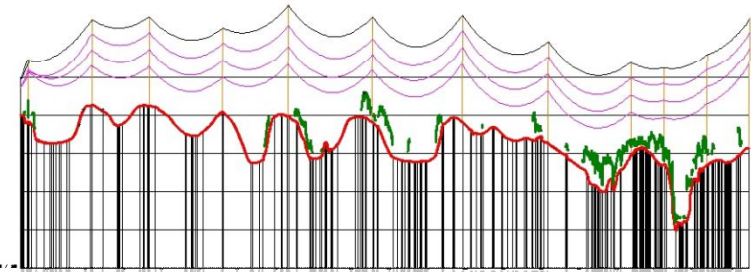
*Planimetry*



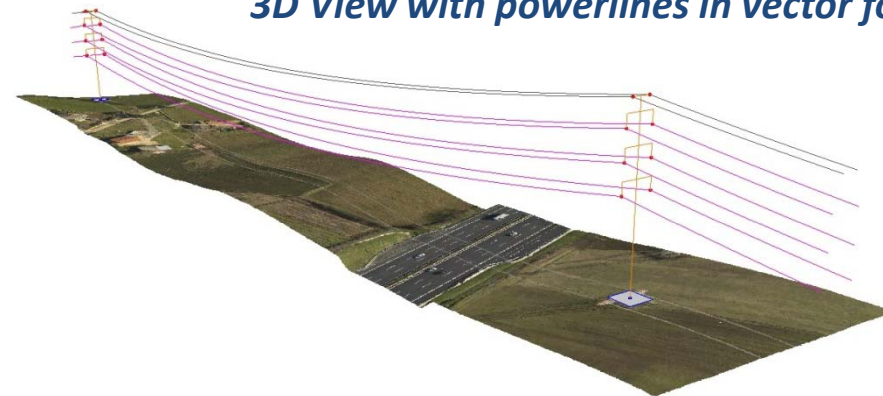
*Section*



*Longitudinal Profile*



*3D View with powerlines in vector format*



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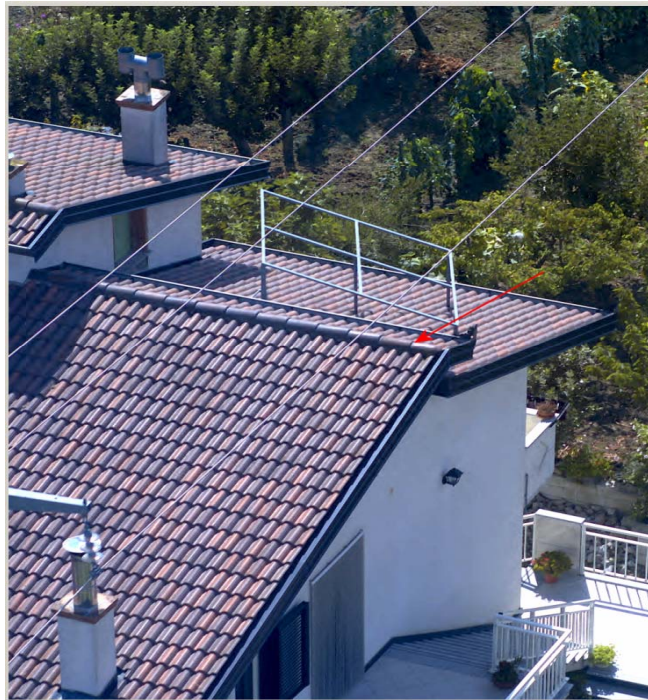




MONITORING AND MAPPING OF INFRASTRUCTURES

**DETECTION PHASE - ANOMALIES IDENTIFICATION**

*Powerlines*



Signalling of critical situation by visual way



Signalling of critical situation measuring the real distance between conductors and objects





## MONITORING AND MAPPING OF INFRASTRUCTURES

### DETECTION PHASE - ANOMALIES IDENTIFICATION

## Powerlines



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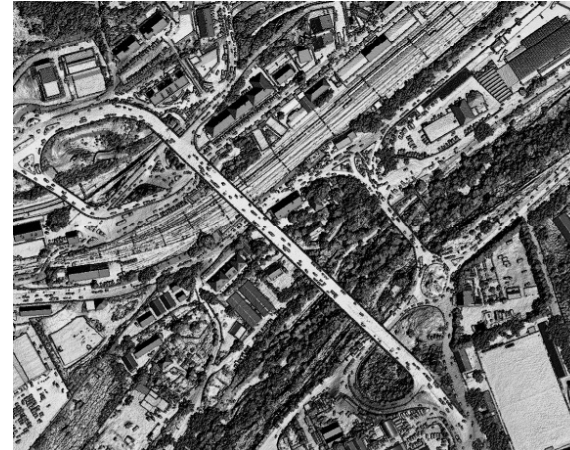




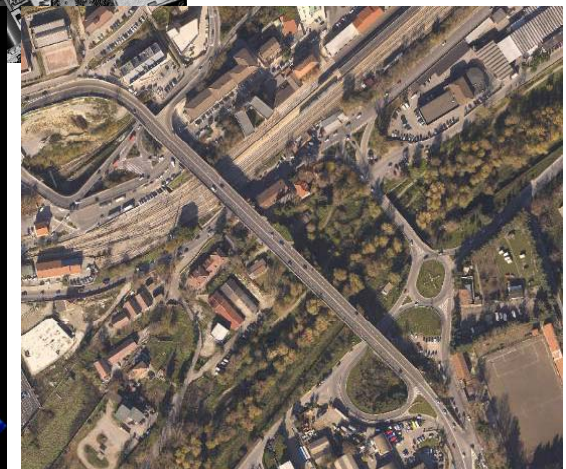
## MONITORING AND MAPPING OF INFRASTRUCTURES

### Roads

*Orthophoto  
and  
Cloud points*



Cloud points,  
Orthophoto  
and  
Thermal



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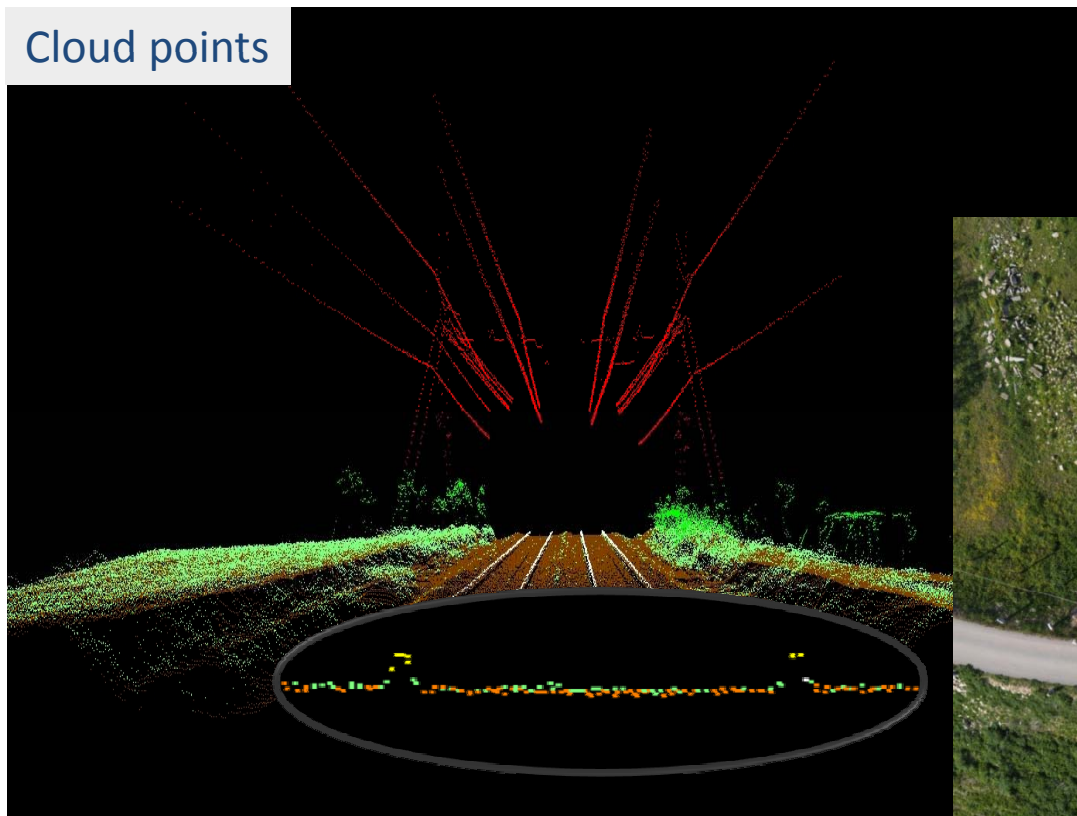




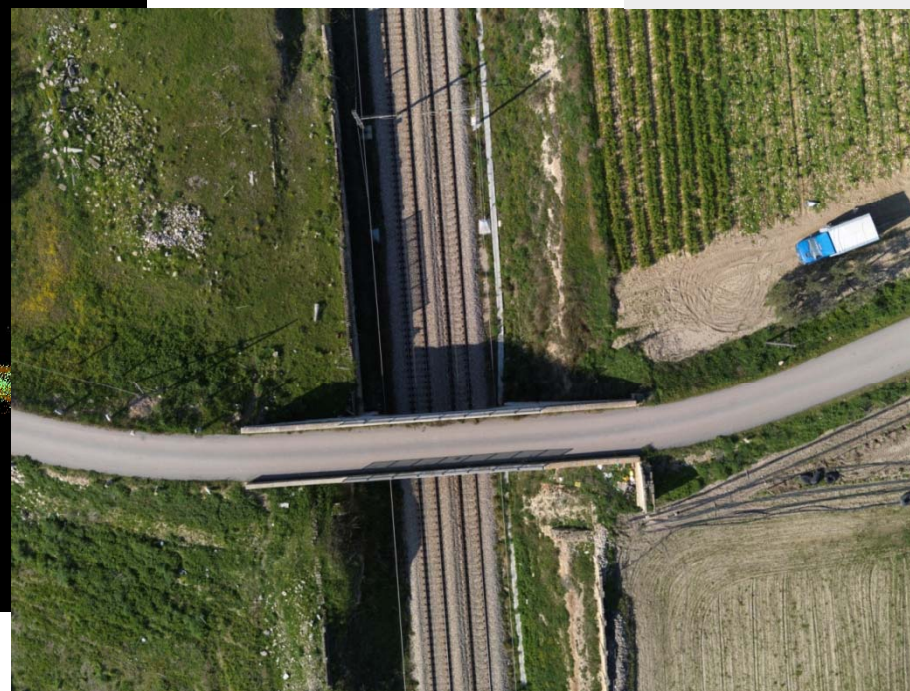
MONITORING AND MAPPING OF INFRASTRUCTURES

*Railways*

Cloud points



Orthophoto



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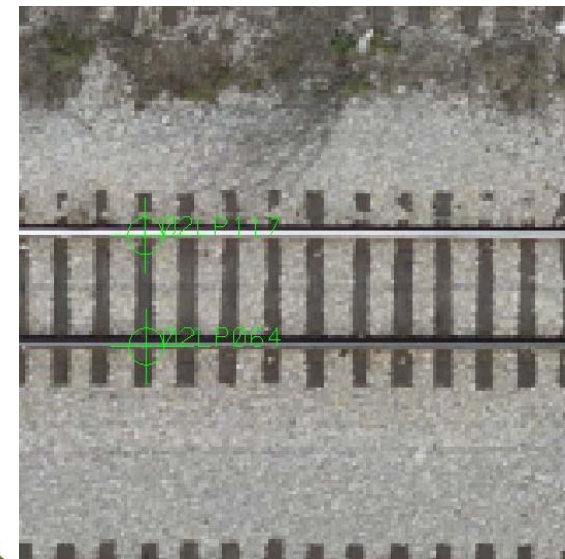
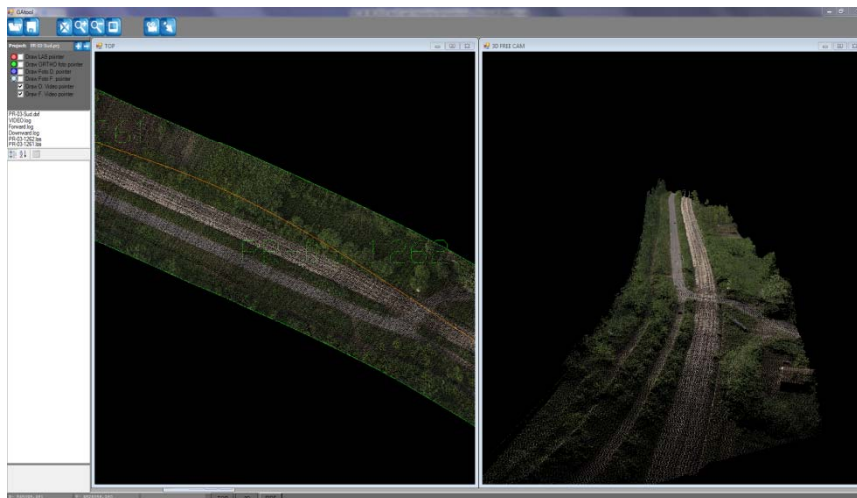
## MONITORING AND MAPPING OF INFRASTRUCTURES

## *Railways*

### **SYSTEM FOR THE ANALYSIS OF TRACK CONDITIONS OF SERBIAN RAILWAYS**

#### **PURPOSES**

- ✓ Fast recording of railway infrastructure
- ✓ Support the Serbian Railways in planning the railway lines' maintenance
- ✓ Reduce Maintenance costs



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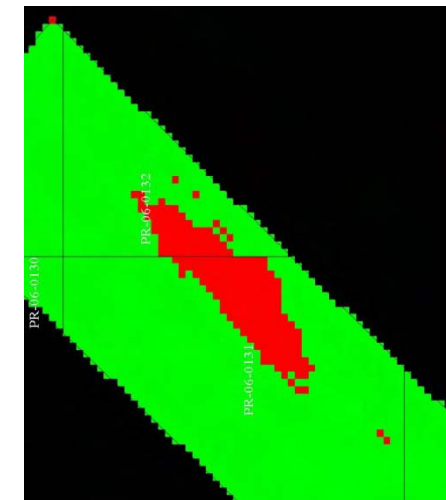
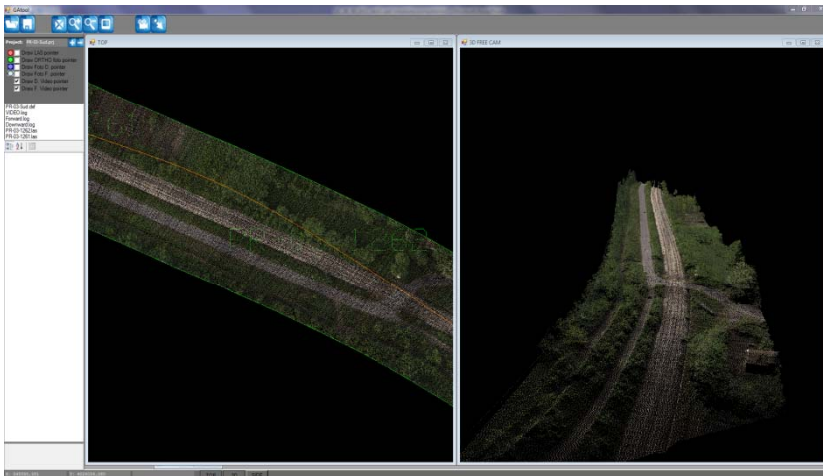
## MONITORING AND MAPPING OF INFRASTRUCTURES

## Railways

### SYSTEM FOR THE ANALYSIS OF TRACK CONDITIONS OF SERBIAN RAILWAYS

#### PROJECT RESULTS

- ✓ Set-up of an appropriate data-base with all relevant objects and assets of SR infrastructure
- ✓ Provide and implement a Railway Management System (RMS) pilot
- ✓ Training the Beneficiaries in RMS
- ✓ Assist Serbian Railways in the procurement process regarding track diagnostic equipments and software



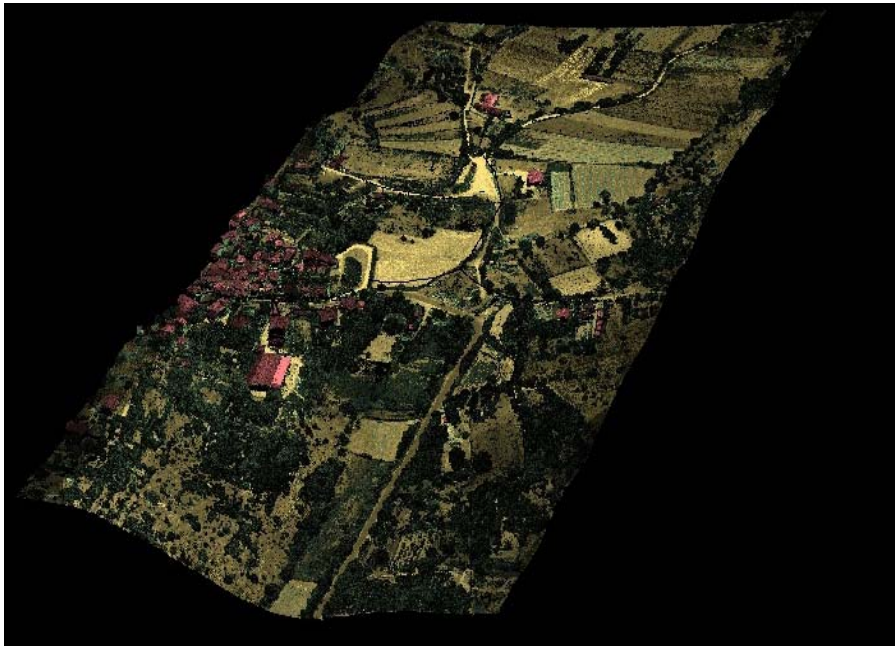
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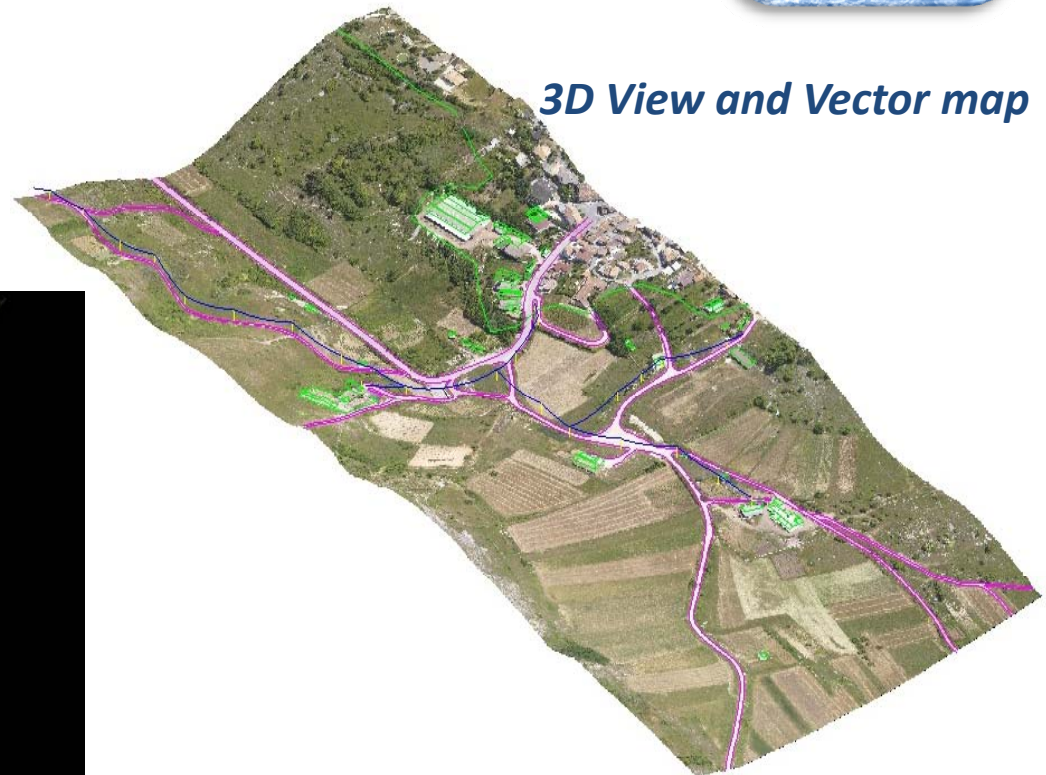
MONITORING AND MAPPING OF INFRASTRUCTURES

*Gas pipelines*

*Cloud points*



*3D View and Vector map*



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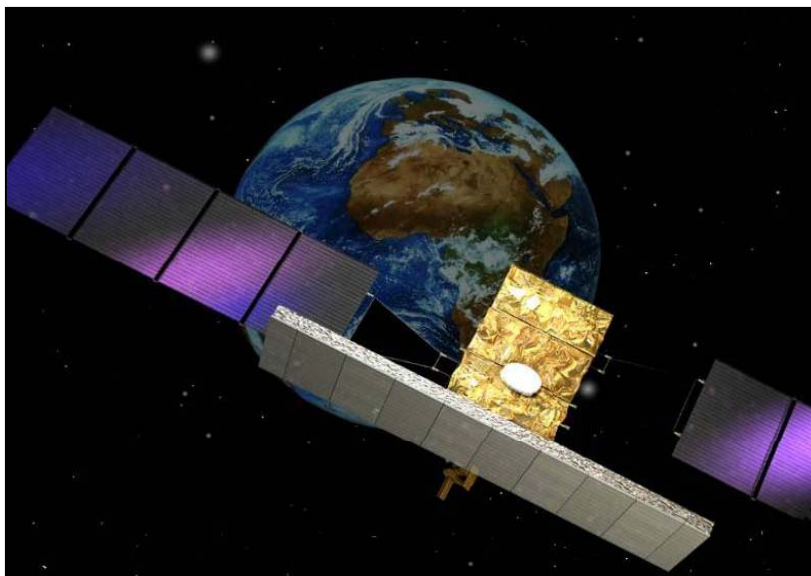


MONITORING AND MAPPING OF INFRASTRUCTURES

*Gas pipelines*

***“SIMO” – INTEGRATED MONITORING SYSTEM APPLICATION TO THE GAS PIPELINE***

*Development of a new remote sensing service integrating aerial and satellite data for GAS pipeline monitoring*



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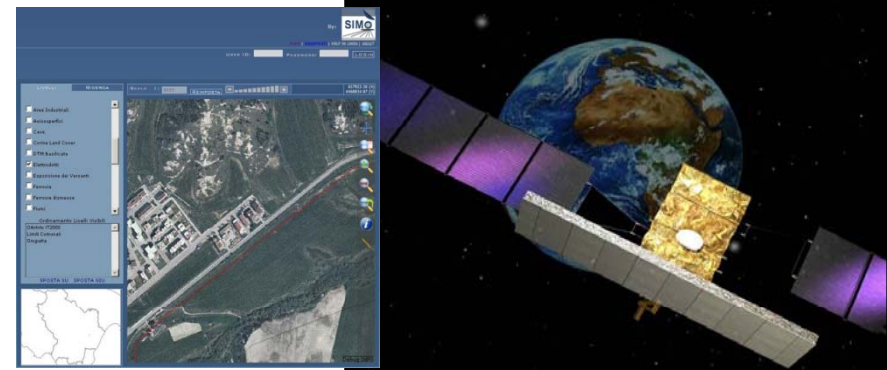
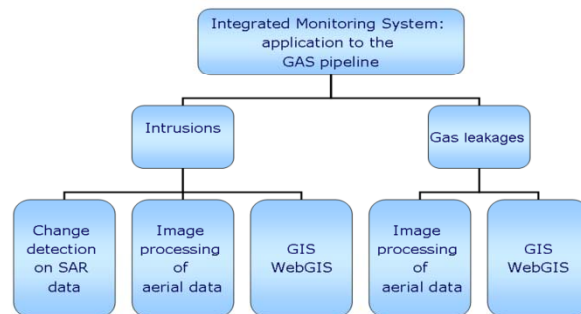


## MONITORING AND MAPPING OF INFRASTRUCTURES

## Gas pipelines

### “SIMO” – INTEGRATED MONITORING SYSTEM APPLICATION TO THE GAS PIPELINE

#### PROJECT OBJECTIVES



- ✓ Acquisition and integration of SAR satellite data by COSMOSkyMed and images from the multi-sensor aerial platform MAPPING
- ✓ Development of image processing algorithms and change detection technique for GAS pipeline monitoring in order to identify hazards (e.g. heavy lorries and gas leakages)
- ✓ Carrying out of GIS/WebGIS in which the developed algorithms and procedures are engineered. The system allows to interoperate with the COSMO-SkyMed Ground-Segment, to archive, to manage, to display, to look through and to publish the input and output data of the processing.





### RENEWABLE ENERGY AND POWER LINE & STATION

## *Photovoltaic*

Design and construction of plants for the electricity production from solar source

Photovoltaic power systems on the ground



Photovoltaic power systems on business/industrial factories



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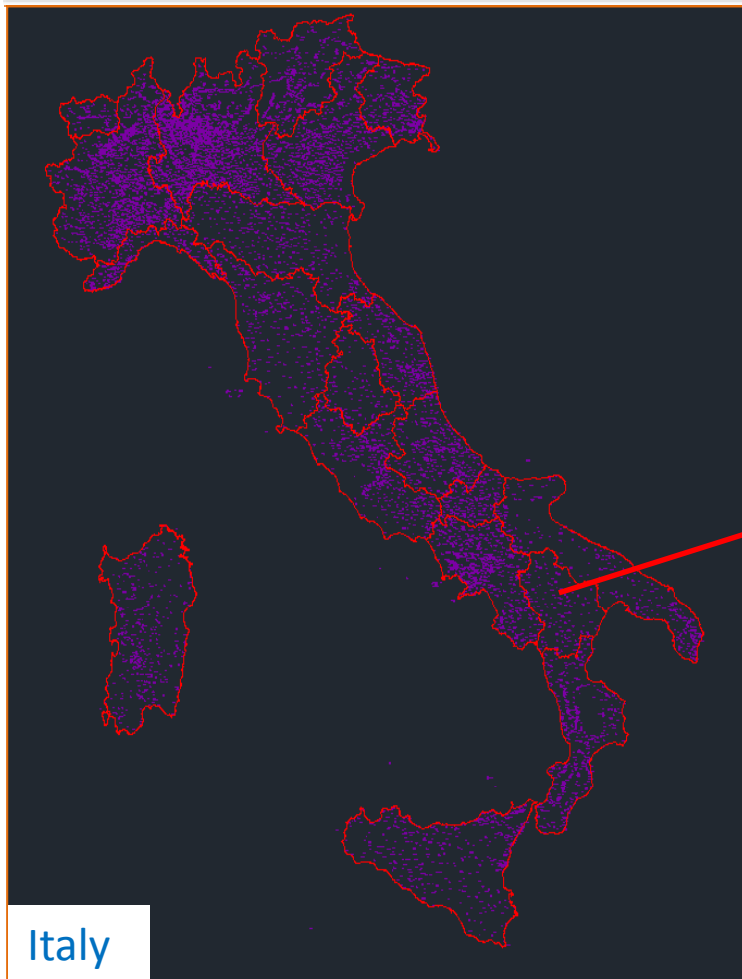




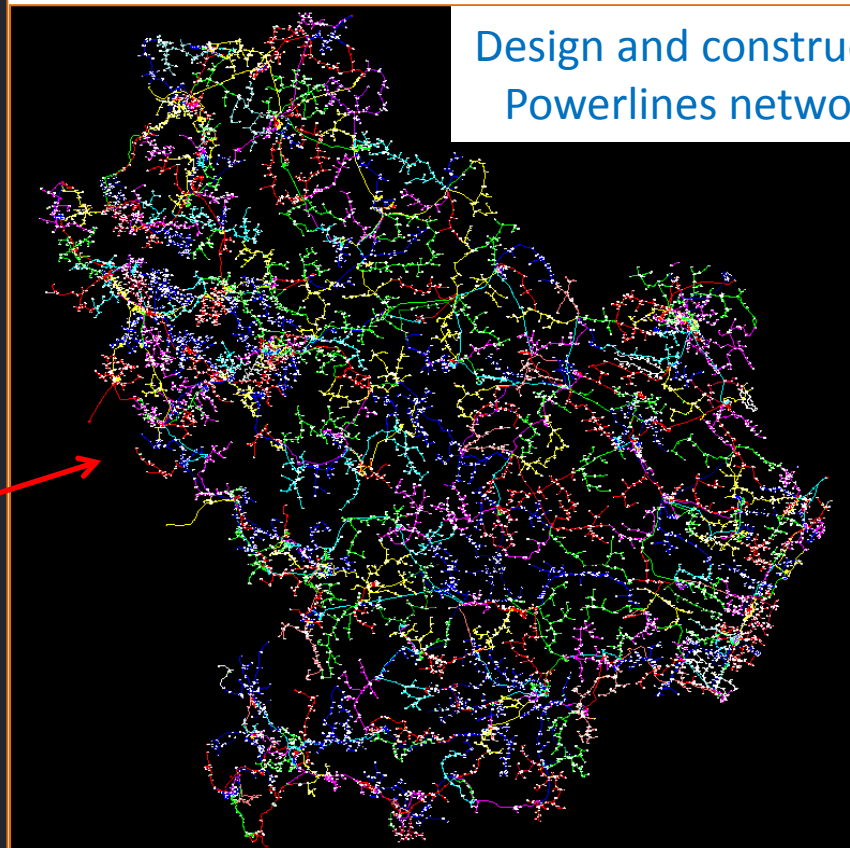
RENEWABLE ENERGY AND POWER LINE & STATION

*Power Lines*

Design and construction of the MT  
Powerlines network – Basilicata



Italy

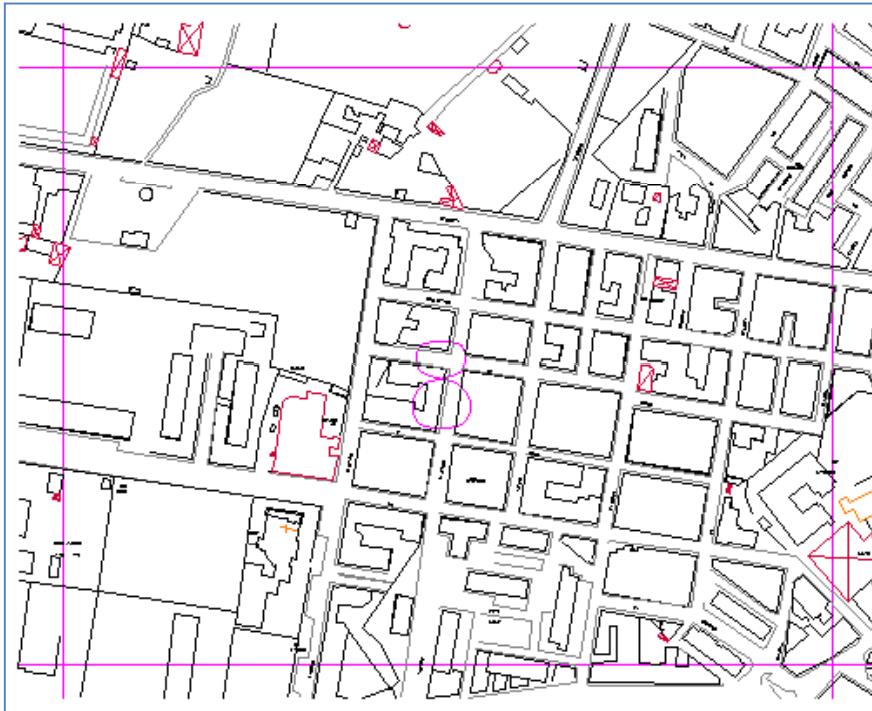


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RENEWABLE ENERGY AND POWER LINE & STATION

*Power Lines*



Powerlines pre – construction



Powerlines post – construction



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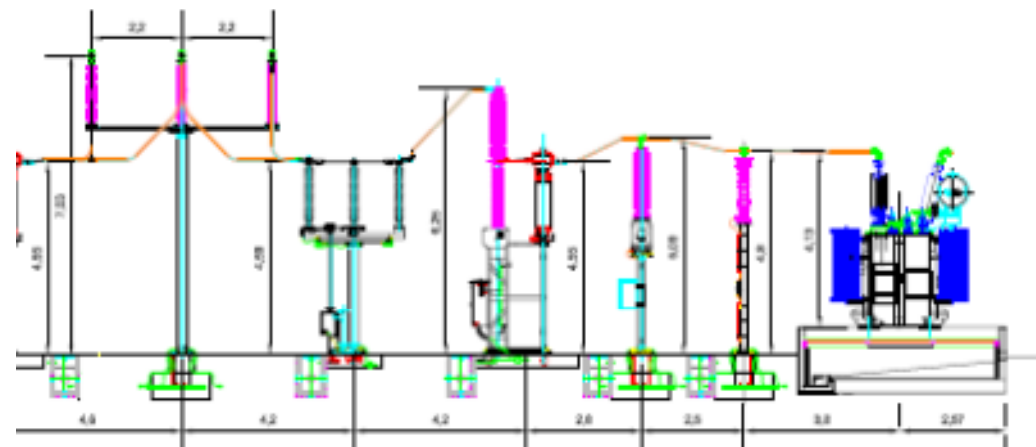
## RENEWABLE ENERGY AND POWER LINE & STATION

## *Power Stations*

### INDUSTRIAL REQUALIFICATION AND DESIGN OF ELECTRIC POWER STATIONS



Industrial requalification and environmental reclamation of the industrial area “Ex sugar refinery of Melfi” with the carrying out of electric power stations from renewable sources: solar station of 60 MW.



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RENEWABLE ENERGY AND POWER LINE & STATION

*Wind Plants*

Design, construction,  
monitoring and  
maintenance of wind  
plants or wind farms for  
the electricity  
production



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RENEWABLE ENERGY AND POWER LINE & STATION

*Biomass Plants*

Organic Resources



Electricity



Biogas Fermenter



Burner



Connection to the electric network



Biogas Tank



Heating



Design and construction of biomass plants for the electricity production

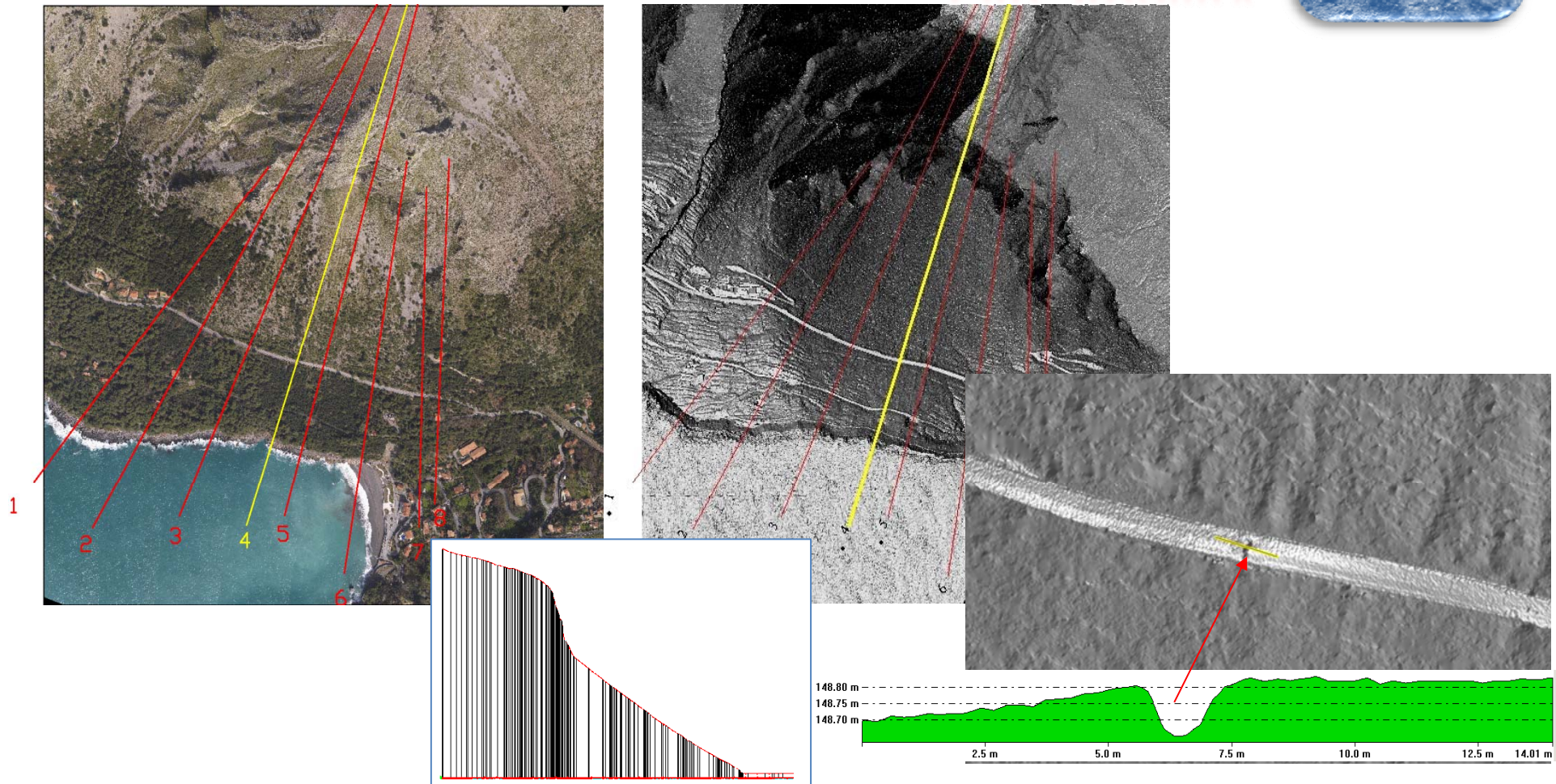






NATURAL RISKS MANAGEMENT

*Cliff Stability*



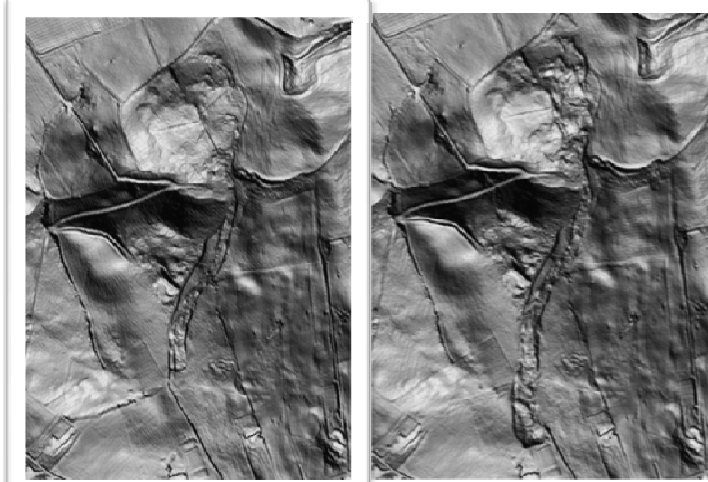
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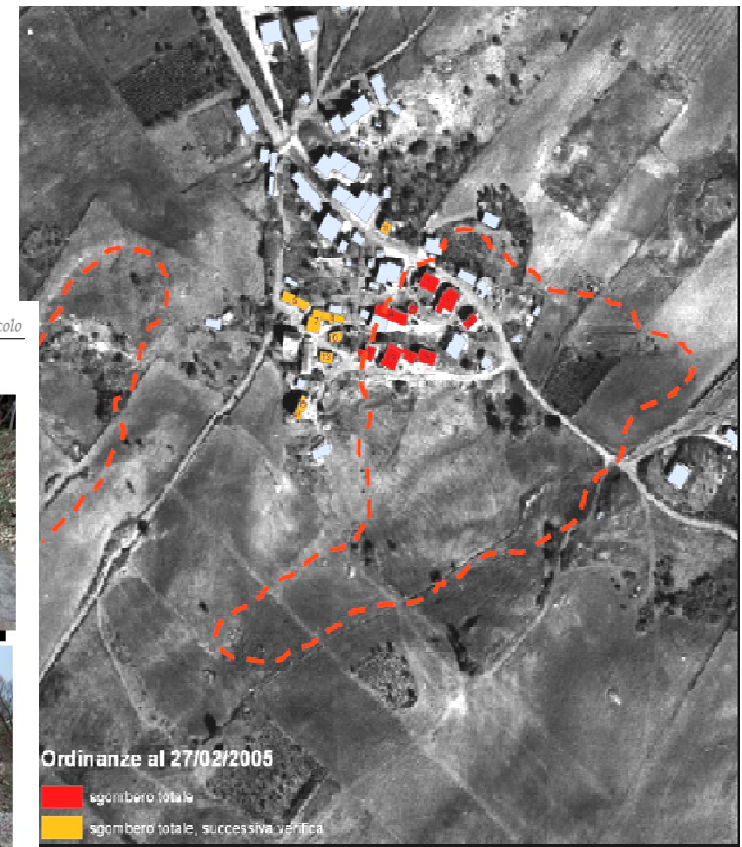
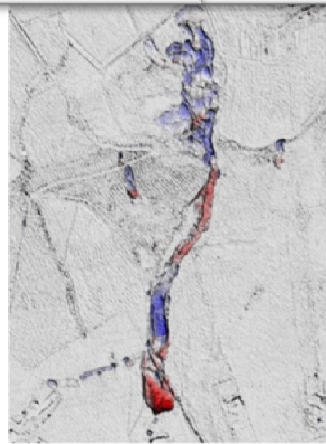


## NATURAL RISKS MANAGEMENT

DTM comparison (2009-2011) of a landslide area



Piano Protezione Civile Emergenza Bosco Piccolo



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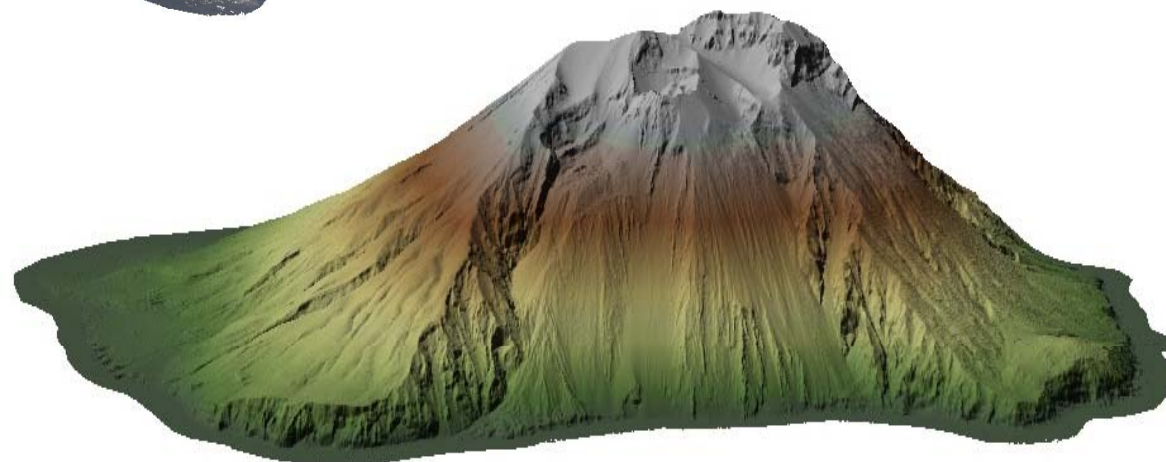
NATURAL RISKS MANAGEMENT

*Volcanos*



*3D View*

*Digital Terrain Model*

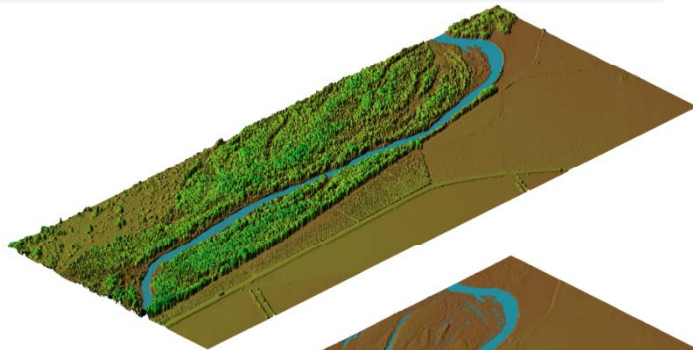


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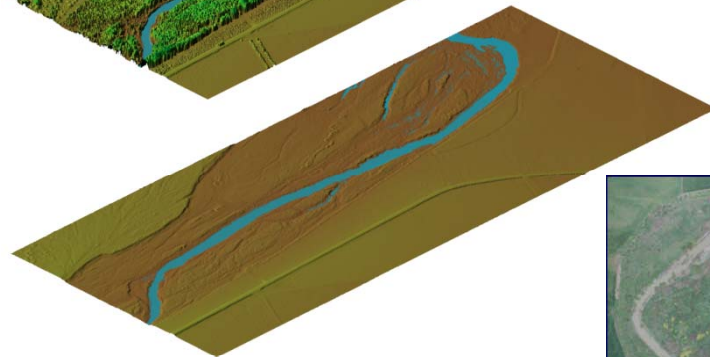


NATURAL RISKS MANAGEMENT

*Rivers*



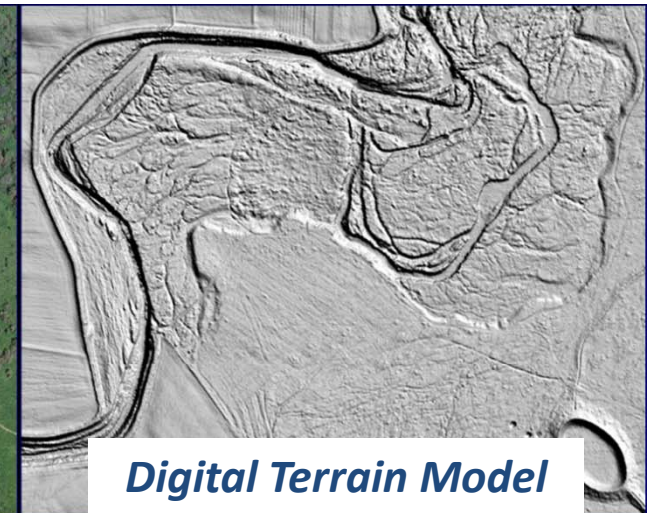
*Digital Surface Model*



*Digital Terrain Model*



*Ortophoto*



*Digital Terrain Model*



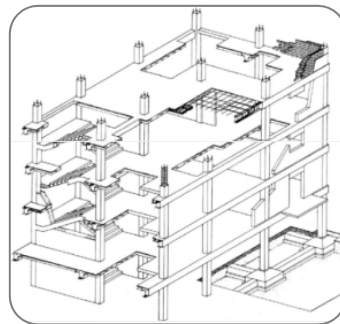
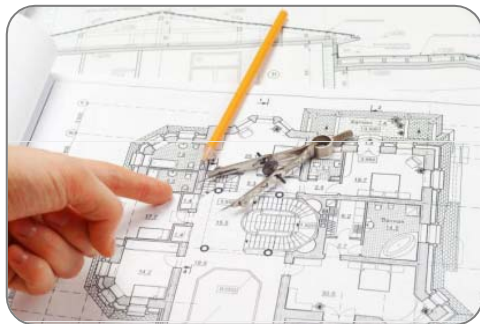




## CIVIL AND INFRASTRUCTURAL ENGINEERING

Specialistic and multidisciplinary feasibility studies and detailed designs:

- ✓ Energy Requalification
- ✓ New Constructions
- ✓ Architectural Reclamation
- ✓ Functional Requalification
- ✓ Urban Planning
- ✓ Structural Retrofitting



## Technical Design



- Structural Engineering
- Hydraulic Engineering
- Geotechnical Engineering
- Environmental Engineering
- Architecture



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## CIVIL AND INFRASTRUCTURAL ENGINEERING

### *Railways*



Railways Urban Crossing



Renewal of existing lines or design of new lines

Central or Medium Stations



Technological Buildings



Shelter and Platforms



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## CIVIL AND INFRASTRUCTURAL ENGINEERING

### *Motorways and Roads*

**Studies and designs**  
(preliminary/detailed/final projects,  
feasibility studies) related to the road  
and motorway network



**Project Management and Works  
Supervision** (expropriations, utilities  
diversions, project controlling,  
inspection and testing, acceptance,  
handover).

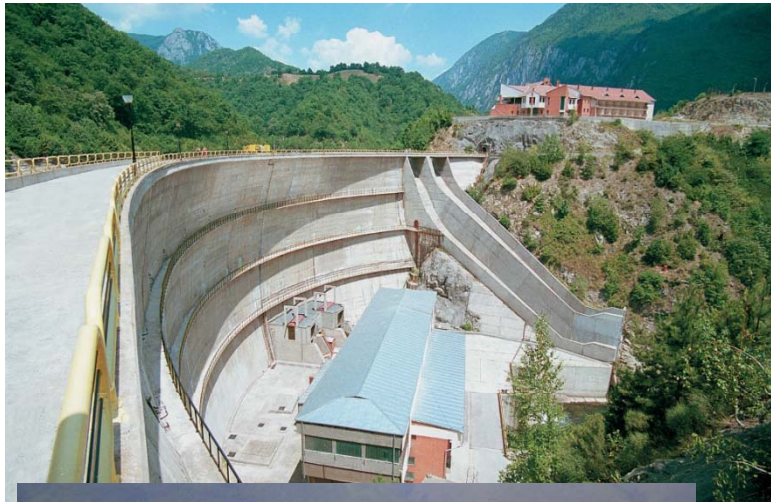


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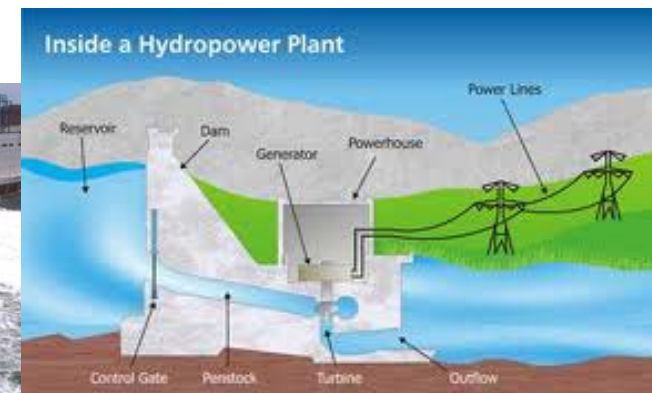


## CIVIL AND INFRASTRUCTURAL ENGINEERING



### *Hydraulic Engineering*

- ✓ Water Infrastructure
- ✓ Dam safety inspection
- ✓ Hydropower plants
- ✓ Flood Risk Assessment
- ✓ Sewerage and drainage system



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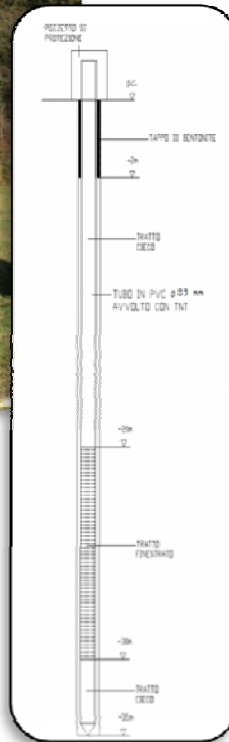




## CIVIL AND INFRASTRUCTURAL ENGINEERING

### *Environmental Engineering*

- ✓ Geotechnical site investigation
- ✓ Water and soil sampling
- ✓ Water and soil analysis
- ✓ Environmental impact assessment

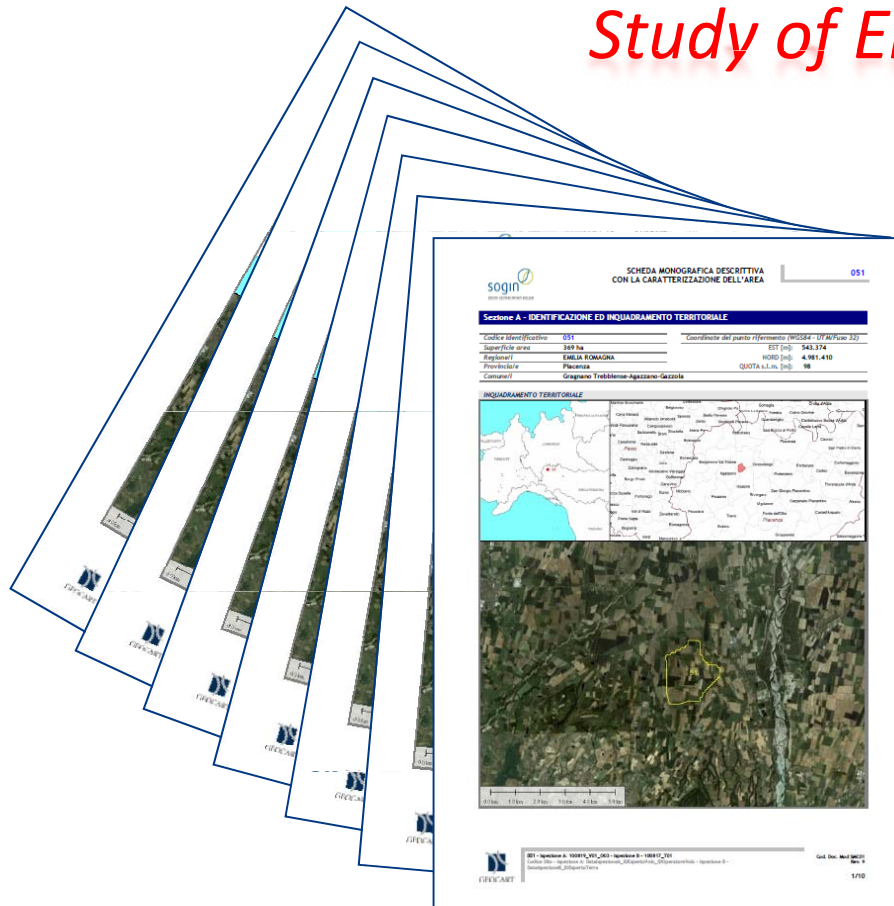




## TERRITORIAL AND ENVIRONMENTAL MONITORING

### Study of Environmental Impacts

**Monographic sheet  
with the description of area**



- ✓ **Identification and territorial framework**
- ✓ **Geology and Hydrogeology**
- ✓ **Land use and anthropic features**
- ✓ **Movies and images**
- ✓ **Technical annexes**



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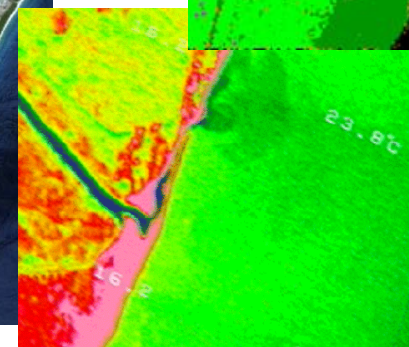
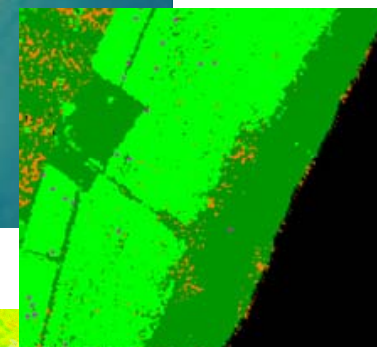
## TERRITORIAL AND ENVIRONMENTAL MONITORING

### *Coast Monitoring*

Geographic Database  
**1949-2008**

#### **DATA SET**

- ✓ IGM Cartography
- ✓ Satellite images (Corona, Spot, LandSat)
- ✓ Aerial Images (VIS, IR)
- ✓ Laser Scanner
- ✓ Hyperspectral Images



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TERRITORIAL AND ENVIRONMENTAL MONITORING

## *Land Classification*

*Geocoded hyperspectral data overlapped on ortophoto*



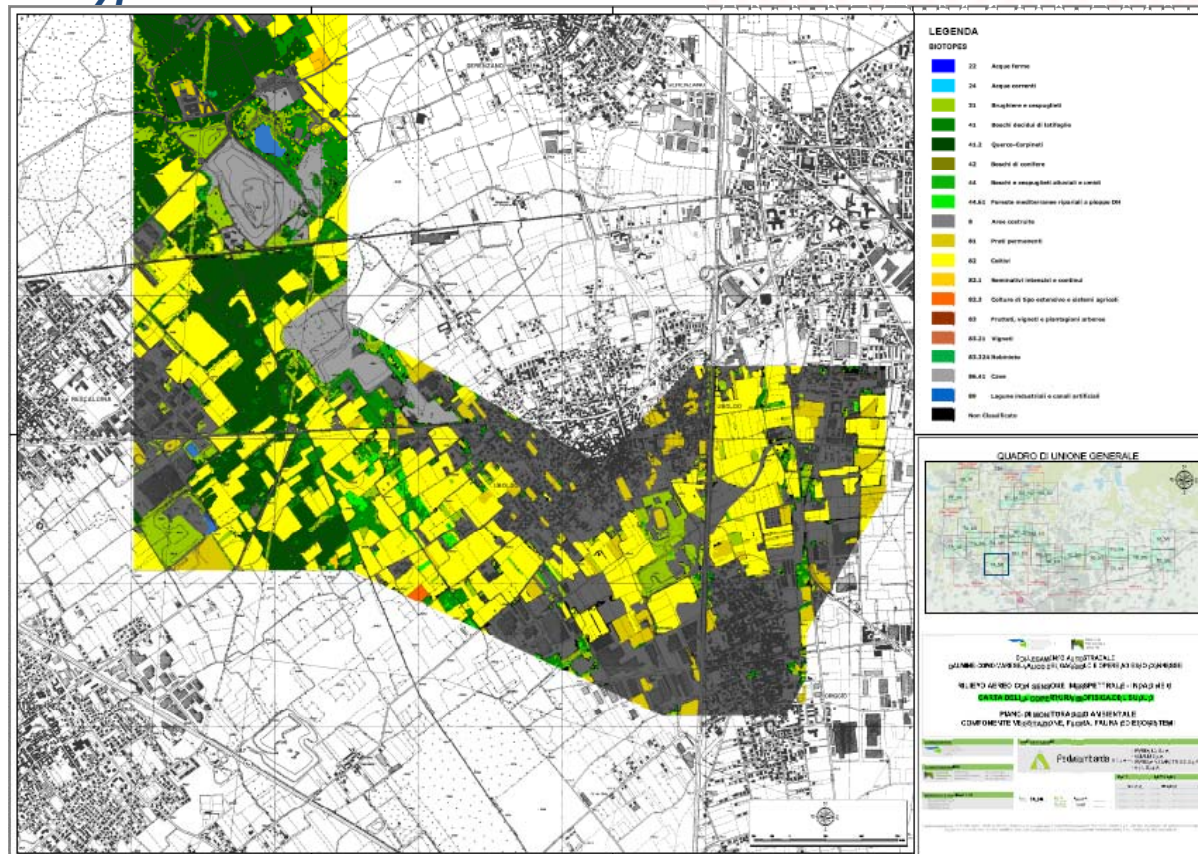
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## TERRITORIAL AND ENVIRONMENTAL MONITORING

## Biotypes chart

## Land Classification



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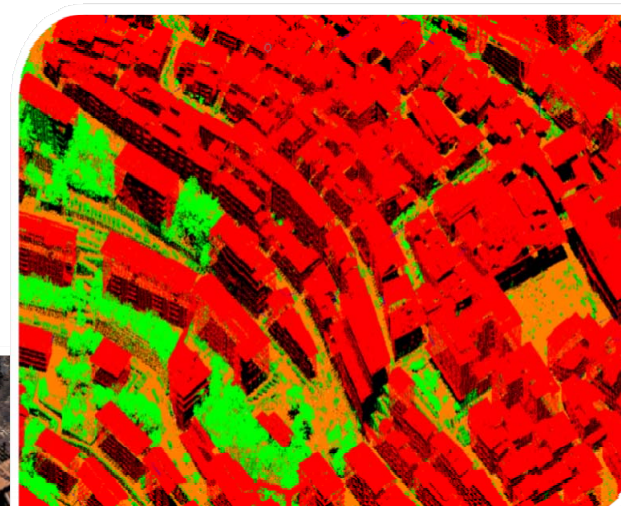
## TERRITORIAL AND ENVIRONMENTAL MONITORING

### City Modeling

#### Orthophoto



*Relevant information in support of the urban planning strategies and territorial management*



#### Classified Cloud Points

#### Cloud Points



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## Our methodological approach

- ✓ Client Needs Analysis
- ✓ Focus on Geocart and its partners **technologies, data and know-how**
- ✓ **Definition of stable** cooperation **relationships** with **public and private Bodies**
- ✓ **Approval** of the **customizable service model** by the **Client**
- ✓ **Service Supplying**





**GEOCART S.p.A.**

Viale del Basento, 120

85100 Potenza (PZ) - **Italy**

+39 0971.56671

**[geocart@geocart.net](mailto:geocart@geocart.net)**

**[www.geocart.net](http://www.geocart.net)**



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