

Presentation:

Drone Thermal Photogrammetry for Mining

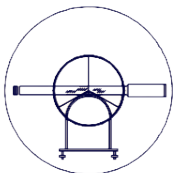
PhD Student:
Javier Sedano Cibrián

Director:
Julio Manuel de Luis Ruiz
Tutor:
Rubén Pérez Álvarez

19 /05/2023

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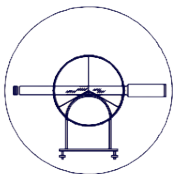
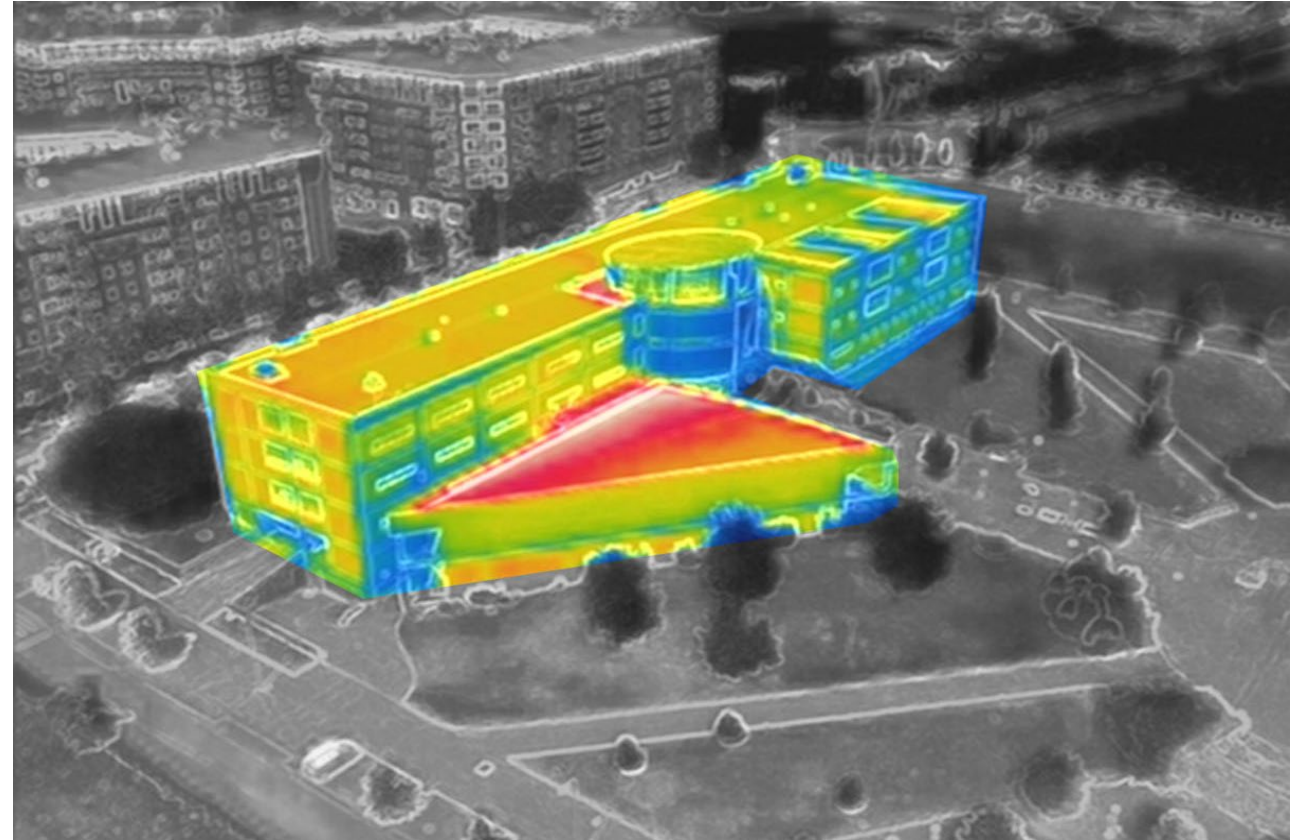
1. Introduction
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1. Introduction

Photogrammetry is a **technique** for the **representation** of an object from its observation. In recent years this technique has been revolutionized by the advent of **unmanned aerial vehicles (UAV)** and the use of **infrared (thermal) sensors**. The particularities of thermal images imply differences in the processing with respect to RGB images.

The lack of proven methodologies for the **generation of thermal 3D models** requires the research and development of **new methodologies and techniques** that enable their implementation.

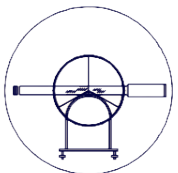
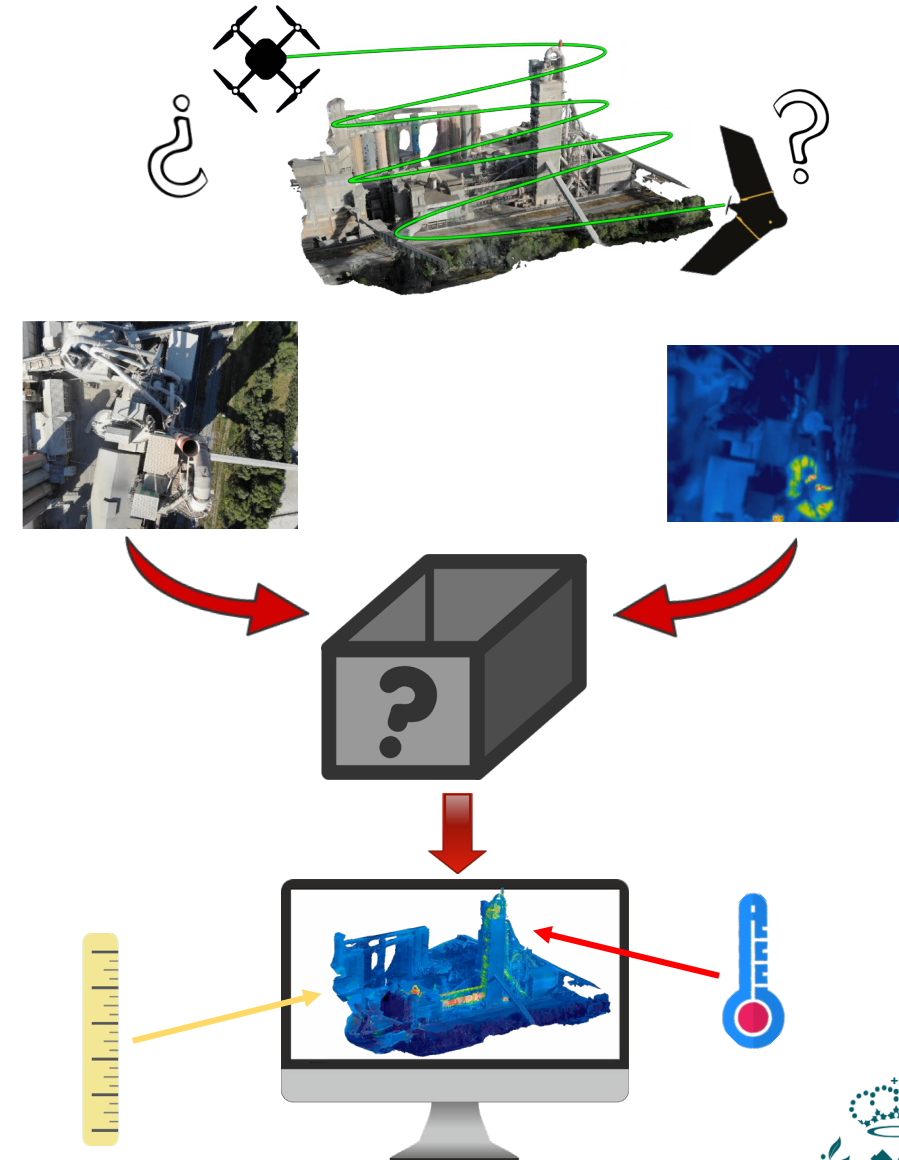


2. Objectives

Main Objective

Methodology for the generation of 3D thermal models which show the temperature at each point of the representation, for their application in mining-industrial environments.

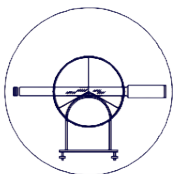
- Criteria for equipment selection and data capture protocol
- Methodology for integration, analysis and processing of geometric and thermal information
- Applications of 3D Thermal Models



3. Acquired Competencies

BASIC SKILLS
CB11 – Systematic understanding of a field of study and command of the skills and research methods related to the field.
CB12 – Skill to conceive, design or create, implement and adopt a substantial process of research or creation.
CB13 – Skill to contribute to the enlargement of the knowledge limits through an original research.
CB14 -Skill to carry out a critical analysis and assessment and synthesis of new and complex ideas.
CB15 – Skill to communicate with the academic and scientific community and with society in general about the scope of knowledge in the ways and languages of common use in the international scientific community.
CB16 – Skill to encourage, in academic and professional contexts, the scientific, technological, social, artistic or cultural progress in a society based on knowledge.

CAPACITIES AND PERSONAL ABILITIES
CA01 – Cope in contexts in which there is little specific information.
CA02 – Find the key questions to be answered to solve a complex problem.
CA03 – Design, create, develop and undertake new and innovative projects in the knowledge scope.
CA04 – Work both in teams and individually in an international or multidisciplinary context.
CA05 – Integrate knowledges, face complexity and formulate judgements with limited information.
CA06 – Intellectual criticism and defence of solutions.



3. Acquired Competencies

Transversal Training

BASIC COURSE	
Skill I	56 h
Skill II	
Skill III	
Skill IV	
Skill V	
ADVANCE COURSE	
Skill I	54 h
Skill II	
Skill III	

Specific Training



Imasgal Técnica

Certifica que

Javier Sedano Cibrian

participó con aprovechamiento en el curso de formación

METASHAPE: Fotogrametría con RPAS y terrestre (Agisoft Photoscan)

Grupo/acción: 01/41100

Clases webinars: 30h Prácticas tutorizadas: 25h Dedicación estimada: 55h Modalidad: Online

Fecha inicio: 2021-03-03 Fecha finalización: 2021-04-21

PARA QUE CONSTE A LOS EFECTOS OPORTUNOS, SE EXPIDE EL PRESENTE CERTIFICADO

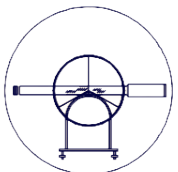


María Jesús García Pérez
Responsable de formación

4-mayo-2021
Fecha de expedición

Este documento se presenta en formato digital con firma digital de la empresa Imasgal Técnica S.L. (CIF B-27398023)

Código de certificación dthxa2NUVXpCeTAxNWJJJaW8n&ZJUT09



4. Results and Progress

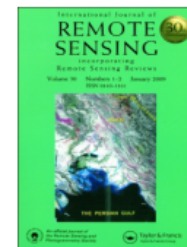
4 Publications in indexed journals



Article

Optimization of Photogrammetric Flights with UAVs for the Metric Virtualization of Archaeological Sites. Application to Juliobriga (Cantabria, Spain)

Julio Manuel de Luis-Ruiz , Javier Sedano-Cibrián, Raúl Pereda-García, Rubén Pérez-Álvarez and Beatriz Malagón-Picón



International Journal of Remote Sensing



ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/tres20>

Metric contrast of thermal 3D models of large industrial facilities obtained by means of low-cost infrared sensors in UAV platforms



Article

Mining Exploration with UAV, Low-Cost Thermal Cameras and GIS Tools—Application to the Specific Case of the Complex Sulfides Hosted in Carbonates of Udías (Cantabria, Spain)

Rubén Pérez-Álvarez ^{1,*} , Javier Sedano-Cibrián ¹ , Julio Manuel de Luis-Ruiz ¹, Gema Fernández-Maroto ² and Raúl Pereda-García ¹

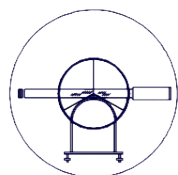


Article

Thermal Water Prospection with UAV, Low-Cost Sensors and GIS. Application to the Case of La Hermida

Javier Sedano-Cibrián , Rubén Pérez-Álvarez , Julio Manuel de Luis-Ruiz , Raúl Pereda-García and Benito Ramiro Salas-Menocal

3 Congress communications



“Drone Thermal Photogrammetry for Mining” - Javier Sedano Cibrián

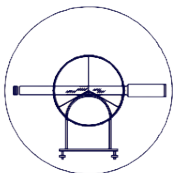
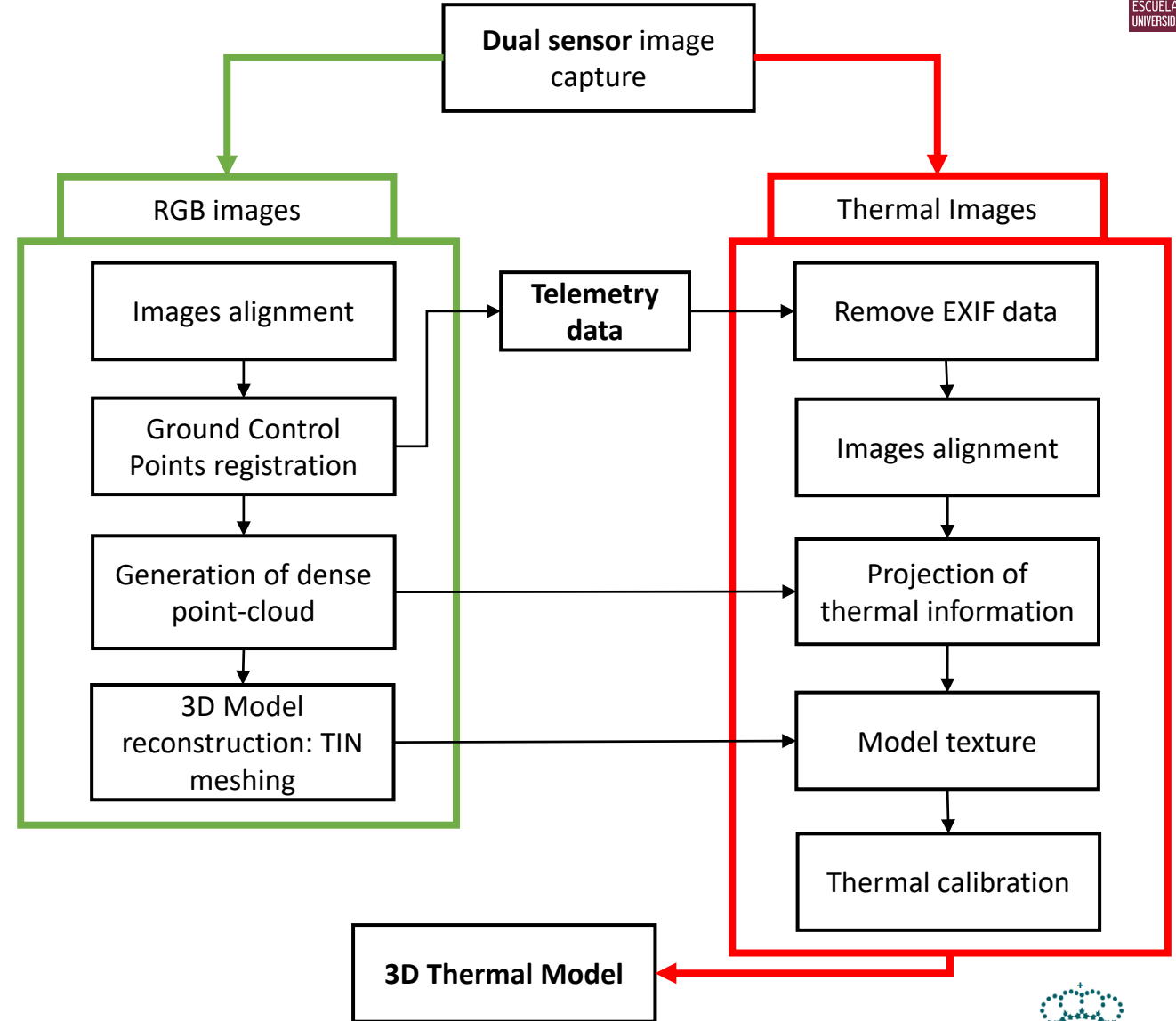


4. Results and Progress

Objetives



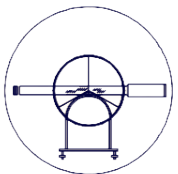
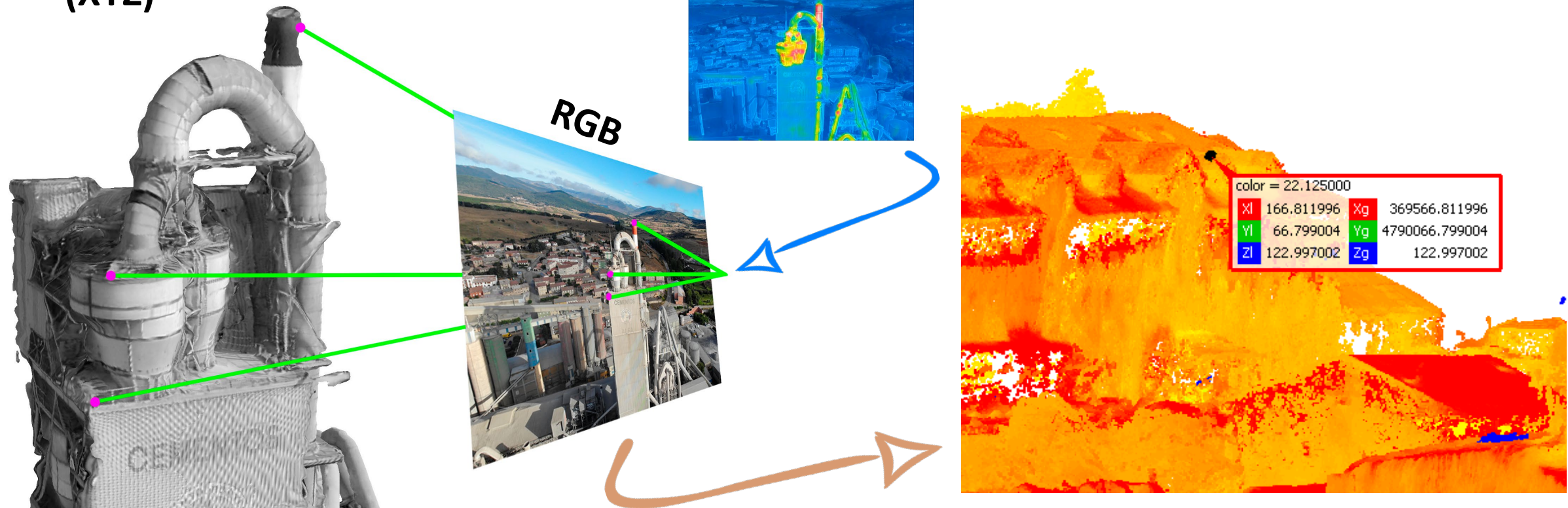
Technique for the generation of 3D thermal models based on UAV photogrammetry and low-cost dual sensors.



4. Results and Progress

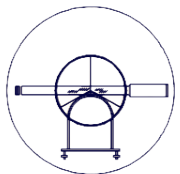
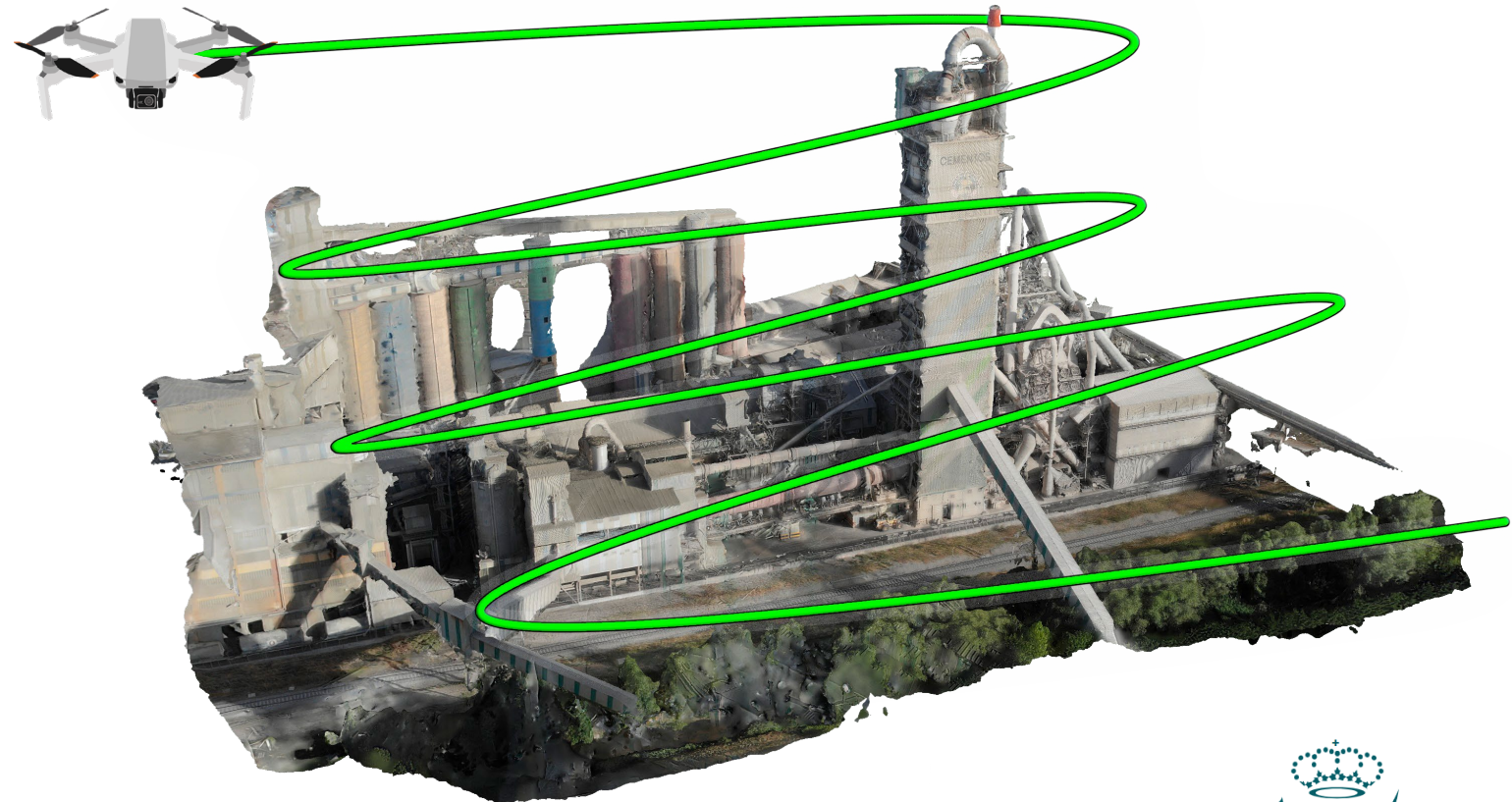
Coordinates
(XYZ)

Temperature



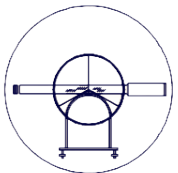
4. Results and Progress

Optimization of photogrammetric flights
Improvement of model accuracy



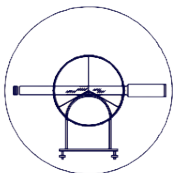
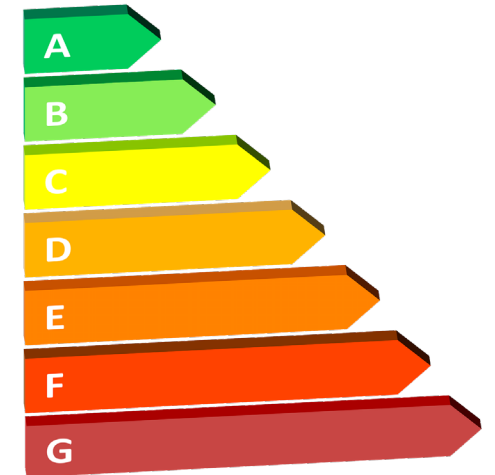
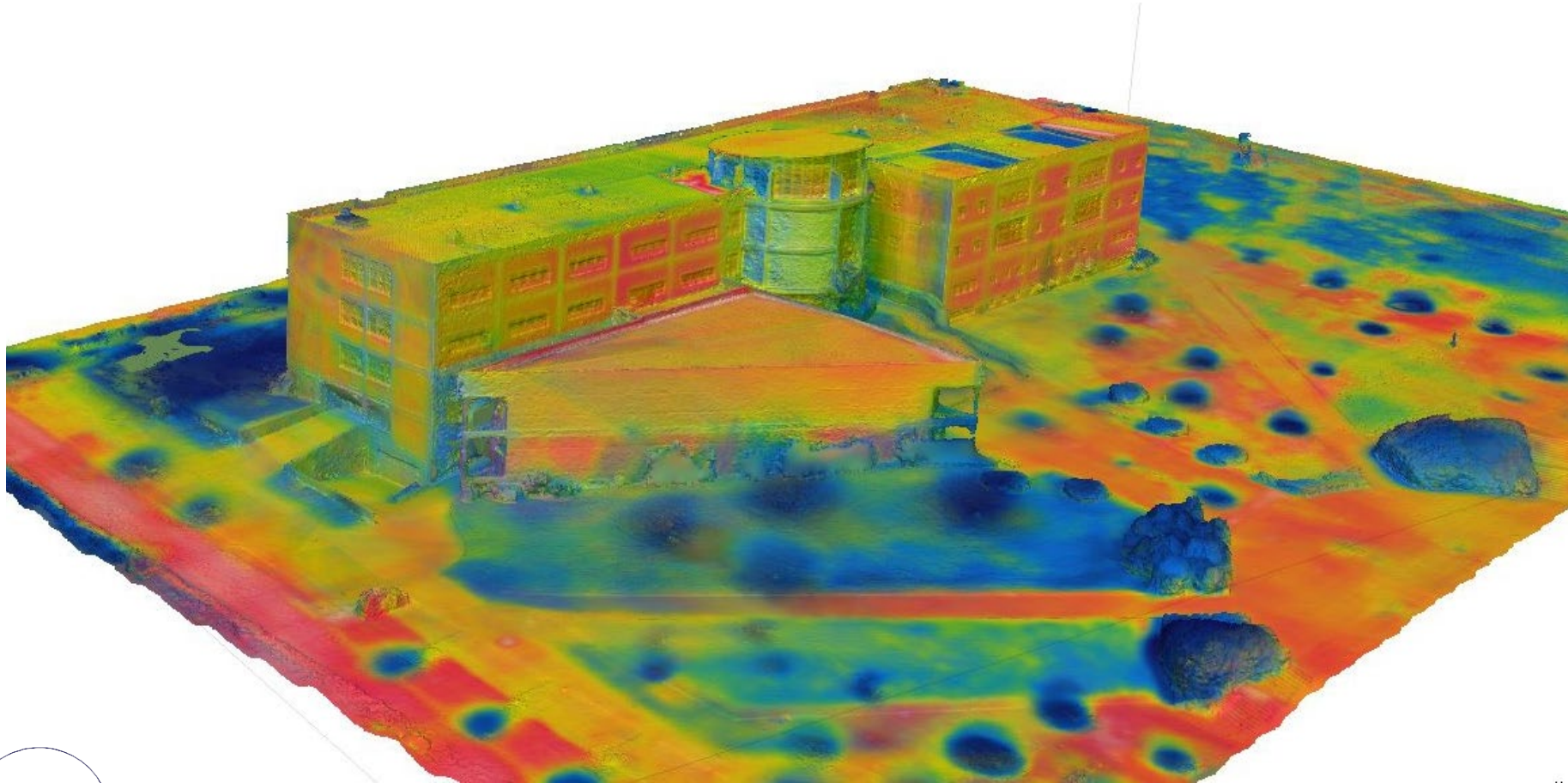
4. Results and Progress

Geometric and thermal 3D modeling method
Structural inspection



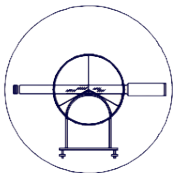
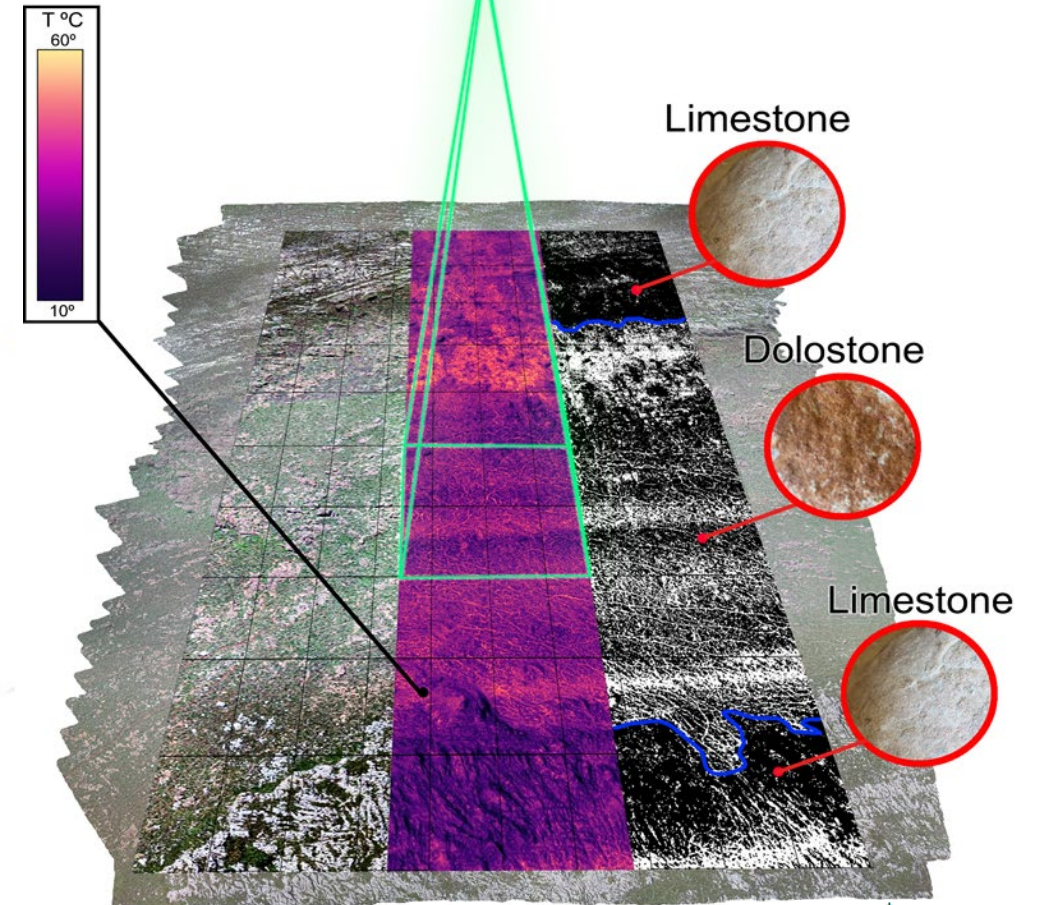
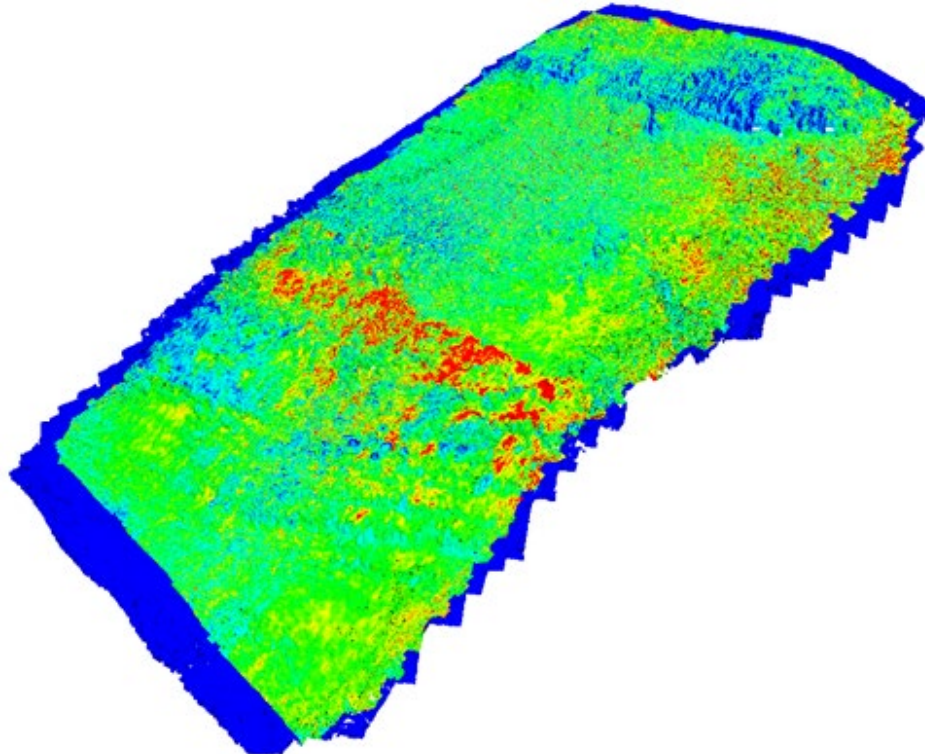
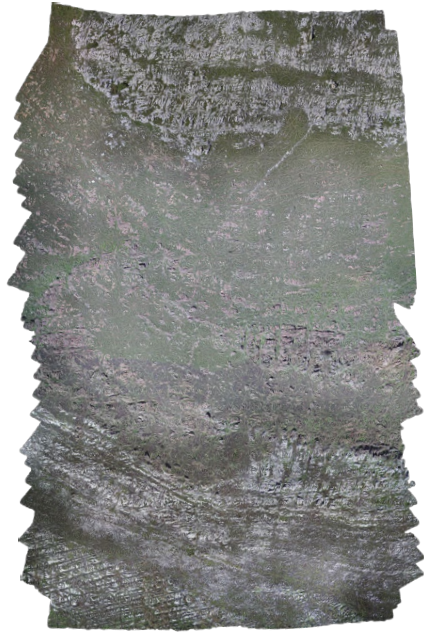
4. Results and Progress

Energy efficiency surveys



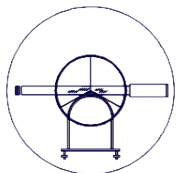
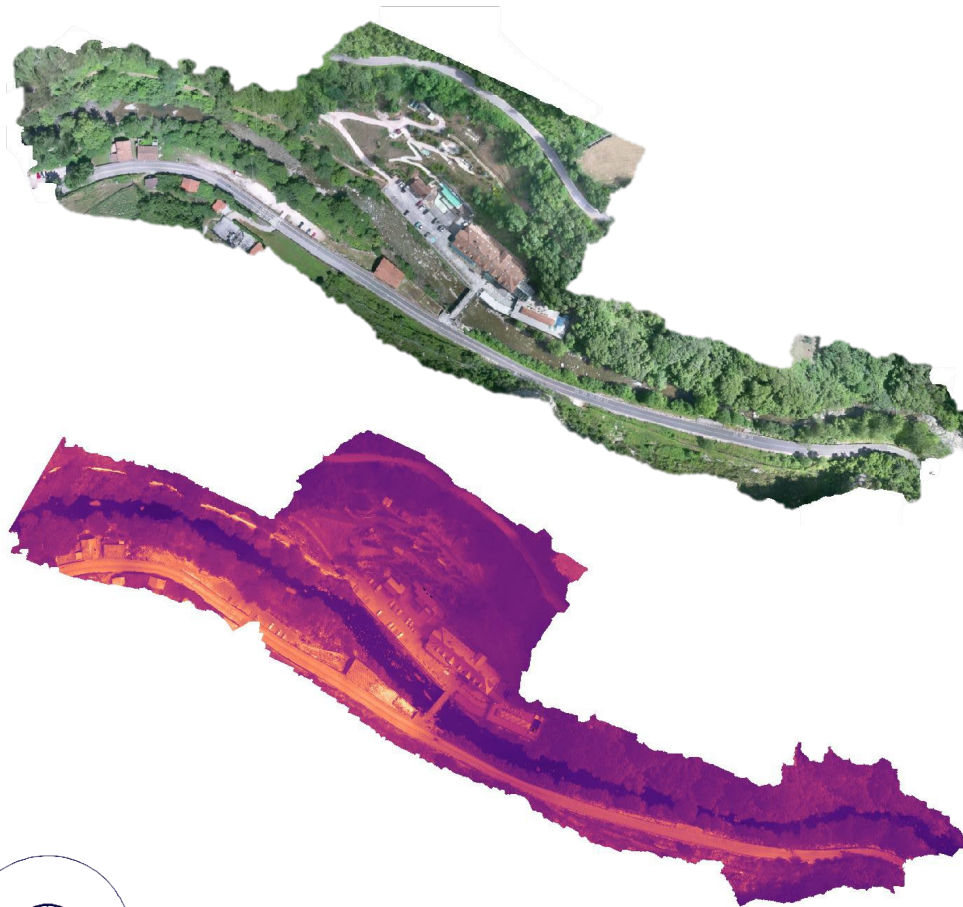
4. Results and Progress

Exploration of mineral resources

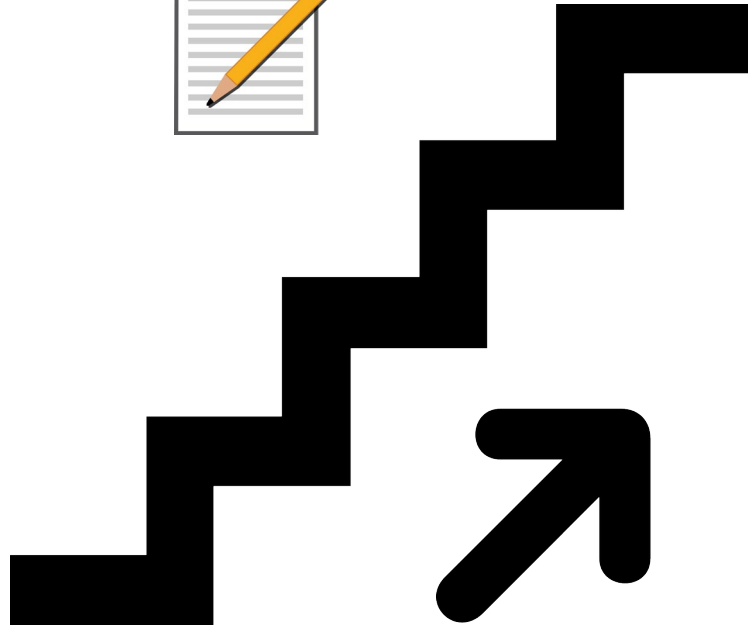


4. Results and Progress

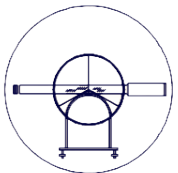
Geothermal (hydrothermal) resources prospecting



5. Expectations for the PhD Thesis presentation



End of 2023



Thanks for your attention

