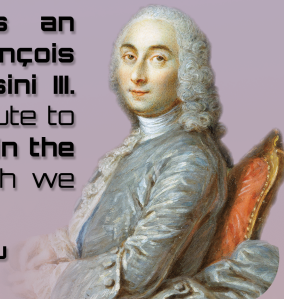# CANssini

Earth mapping through Photogrammetry and Thermal Imaging

"CANssini?"

The name "CANssini" is an homage to César-François Cassini de Thury, or Cassini III. We decided to pay this tribute to Cassini for his **innovations in the field of cartography**, which we explore in our project.
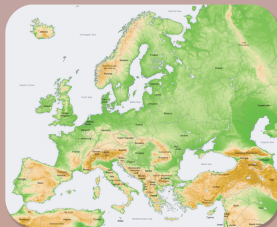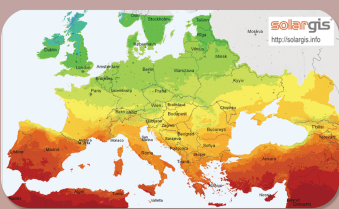
The name itself is a **portmanteau** of "Cassini" and "Can".

Missions

Our primary mission consists of getting temperature and atmospheric pressure data and transmitting this data via telemetry.

Our secondary mission consists of creating a topographic map using photogrammetry and a thermal map using an infrared spectrum camera.

A thermal map and a topographic map of the European continent.

Testing

In order to ensure the proper functioning of our CanSat, we conducted the following tests:

- Impedance Test

In a Rohde & Schwarz device, the impedance was optimized to 50.0 Ω to ensure maximum power transfer between the antenna and coaxial cable, minimizing reflections and signal loss.

M1	430 MHz	49.39-j0.23 Ω
M2	433 MHz	49.20-j0.51 Ω
M3	435 MHz	48.85-j0.25 Ω

- Bilateral Communications Test

By operating the transmitter and receiver in loop mode, bilateral communication was tested at both short and long distances.

- Landing System Test

In order to design the ideal parachute, several tests were carried out with a drone on circular parachutes.
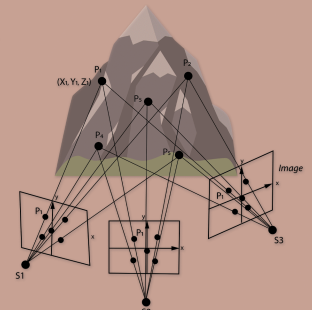
Photogrammetry

To create topographic maps, we use the photogrammetric technique **Structure from Motion (SfM)**, which reconstructs a 3D environment from images taken at different positions and times.

By identifying and matching points of interest across images, we establish mathematical relationships to determine changes in camera position and orientation.

With this information, we can triangulate matched points, similar to how Cassini III used triangulation for mapmaking nearly three centuries ago.

Learn more:

The team:

Alexandre Lopes: Programming
Francisco Dias: Soldering
Martim Nogueira: Graphic Design and PR
Pedro Alexandre: 3D Modelling and Printing
Rodrigo Valério: Antennae
Teodora Martins: Parachutes

António Martins: Supervising Teacher

Organized by: