CBI

Team 2 – Marie Curie

Team Marie Curie

Silvia Arellano - Camila Heard - Santiago Pérez - Abdulrahman Shaker - Jyoti Singh - Pau Oliveras

FusionPoint

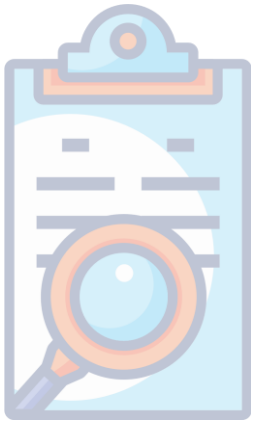
esade UNIVERSITAT RAMON LLULL

UPC UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

IED Barcelona Centre Superior de Disseny

ATTRACT Academy

CERN Ideas



Cancer Diagnosis

Treatment

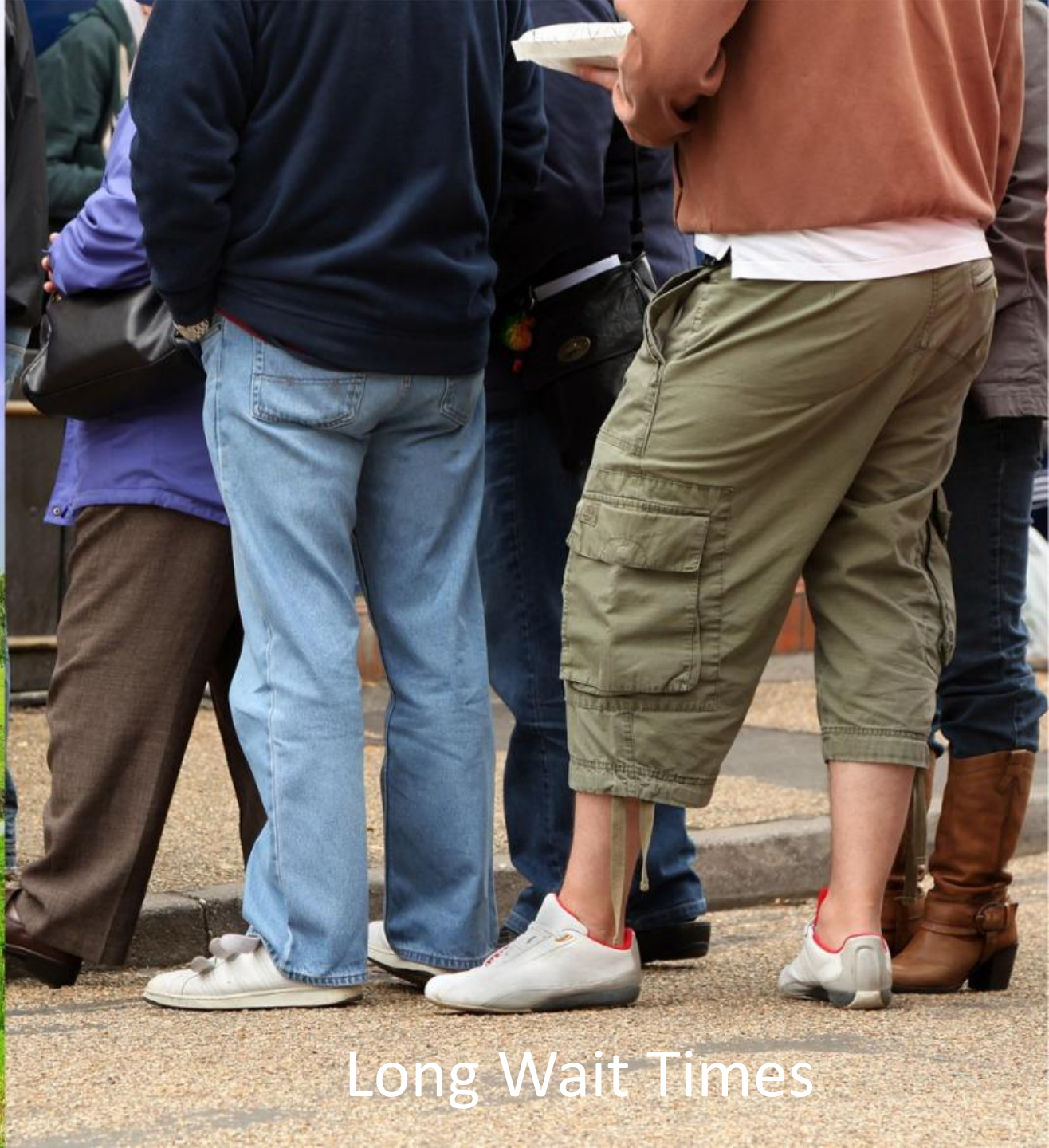
Follow-Up & Monitoring

PET/CT Scan

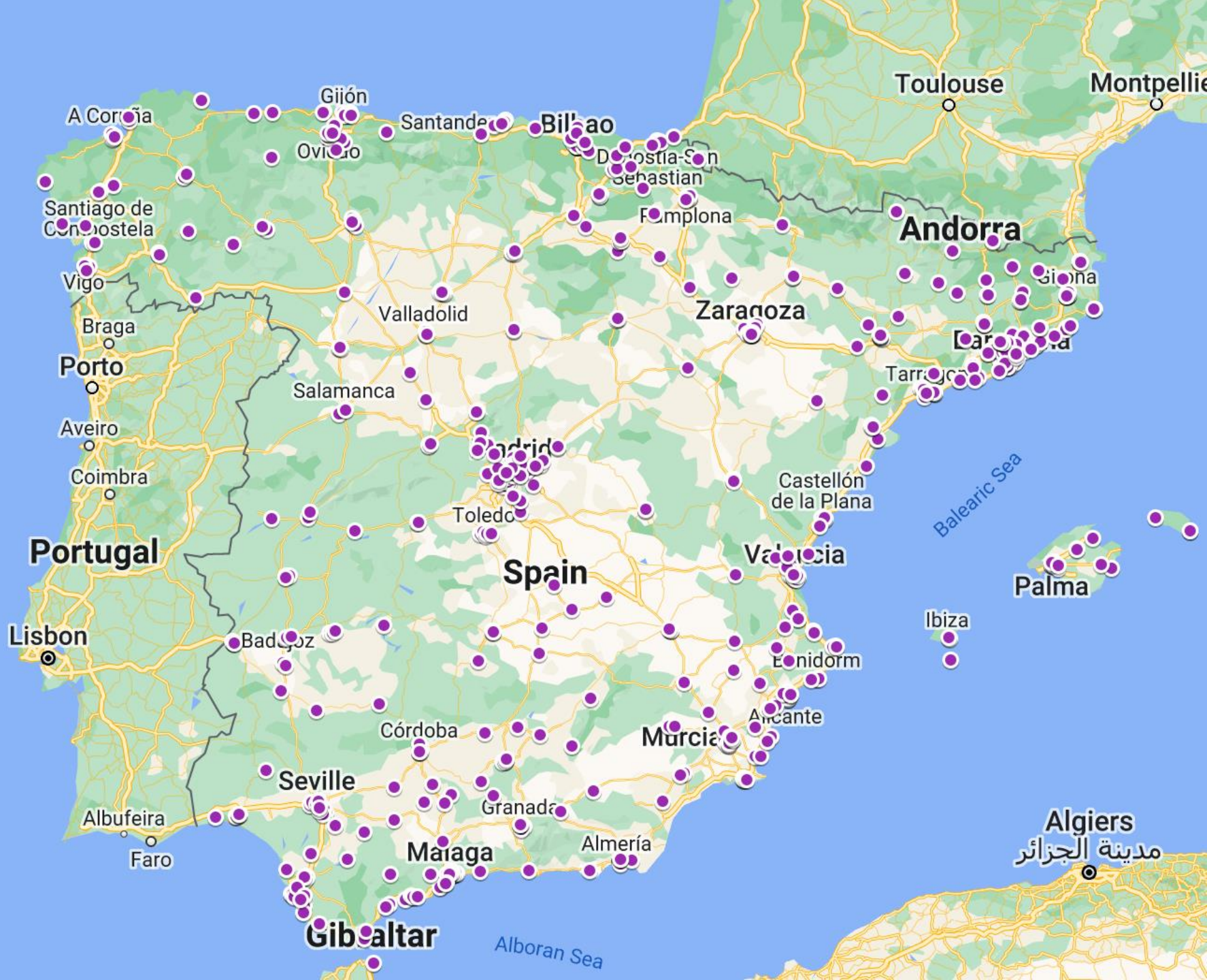
Blood work

Physical Exam

Inadequate Access


Long Wait Times

833 Hospitals

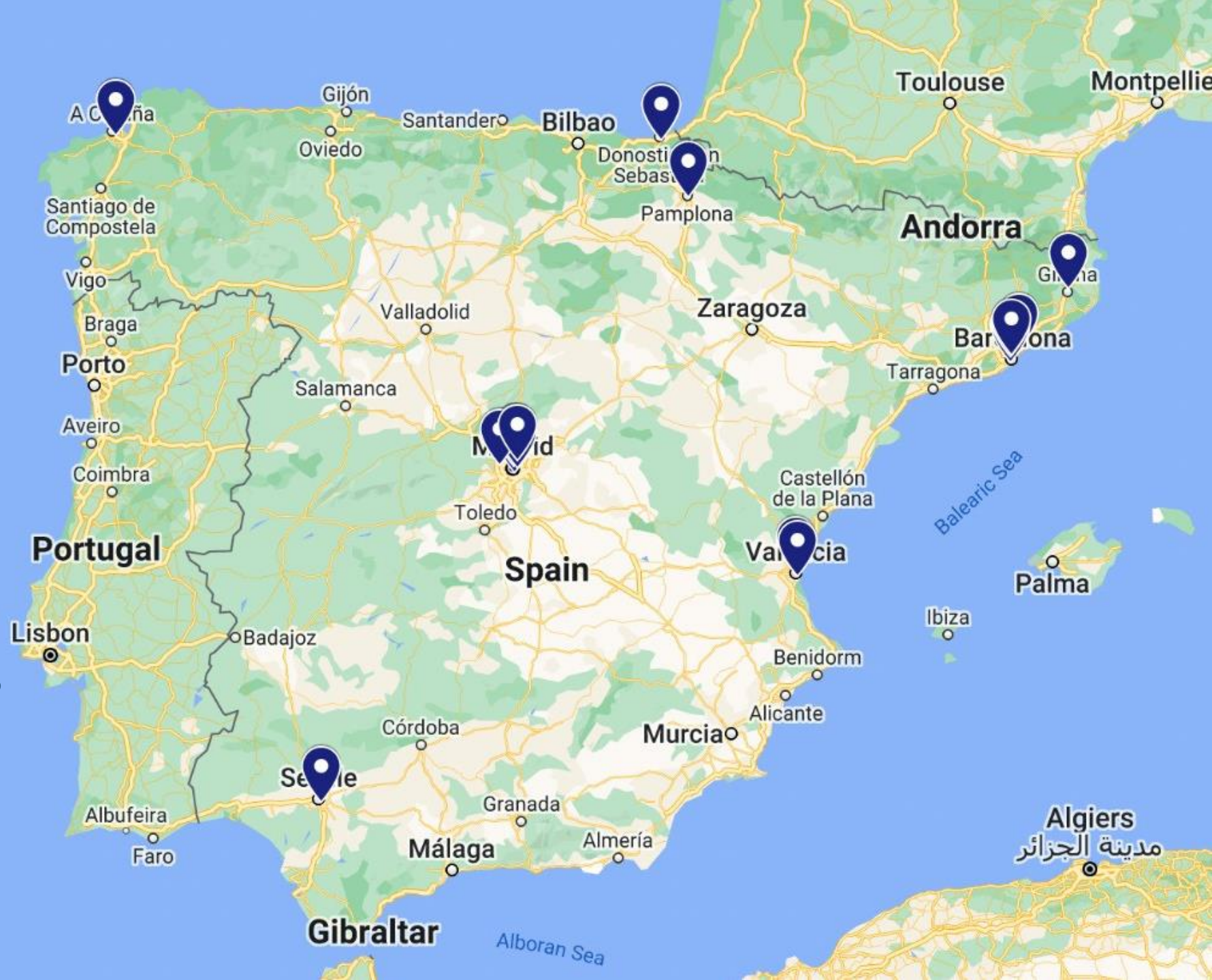


24

Oncology Units

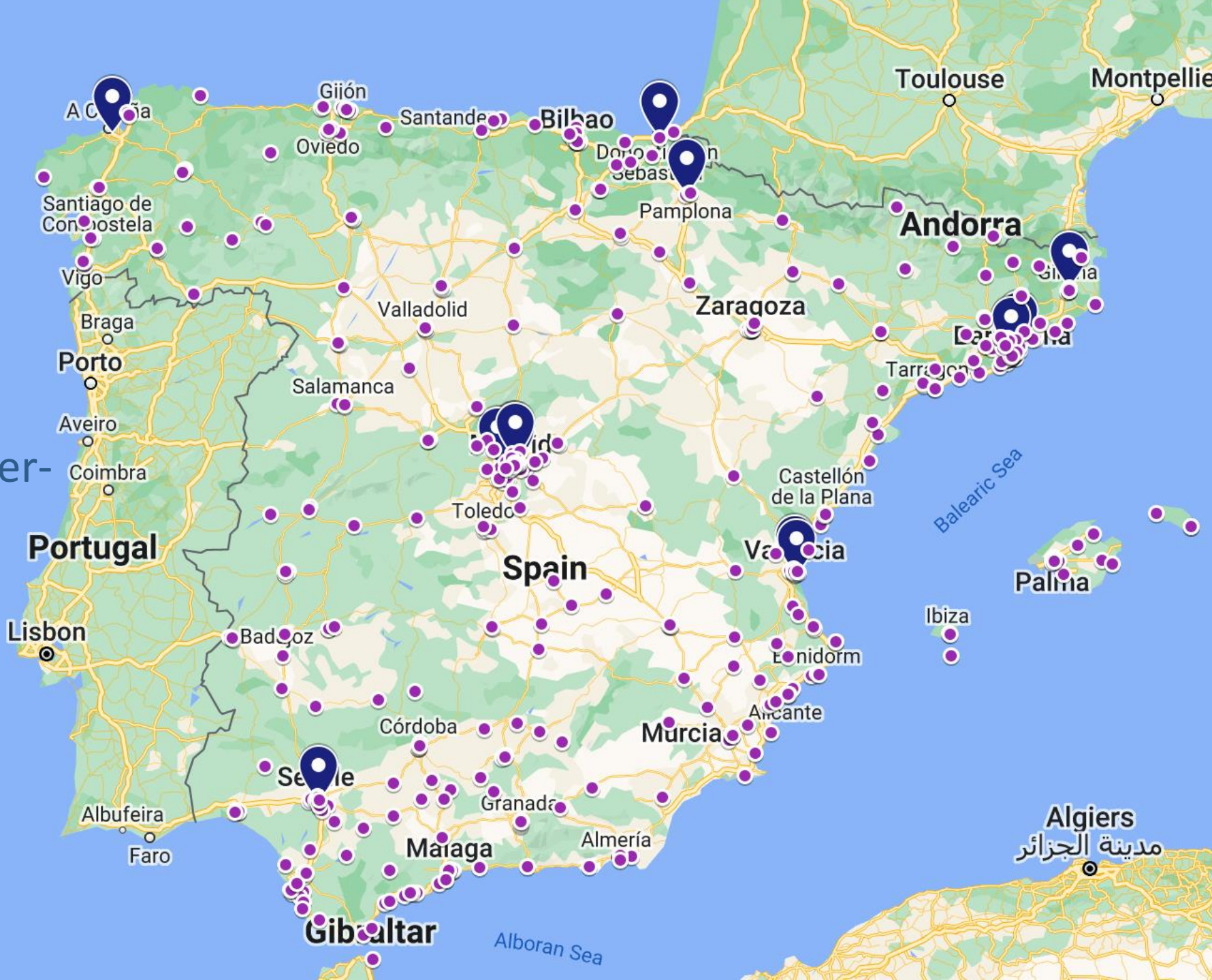
858 220

Recurrent Cancer Cases



Solution

More hospitals with cancer-specific technology



The smart gamma camera for cancer diagnostics.

HOW IT WORKS

Radiotracers

Scan

Transmit

Analysis

Visualization

HOW IT WORKS

Radiotracers

Scan

Transmit

Analysis

Visualization

HOW IT WORKS

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Visualization

HOW IT WORKS

Radiotracers

Scan

Transmit

Analysis

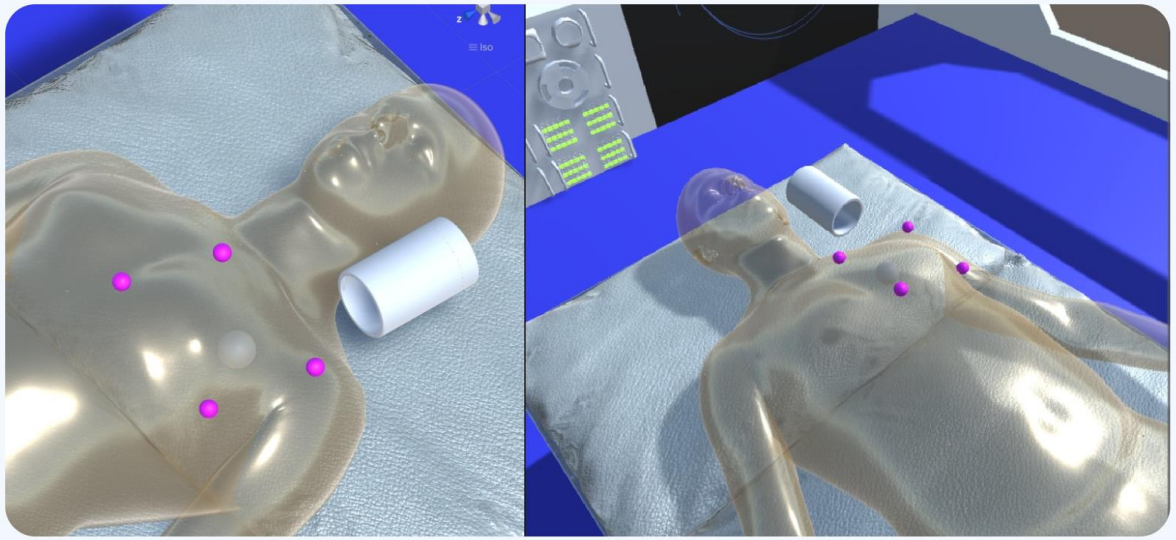
Visualization

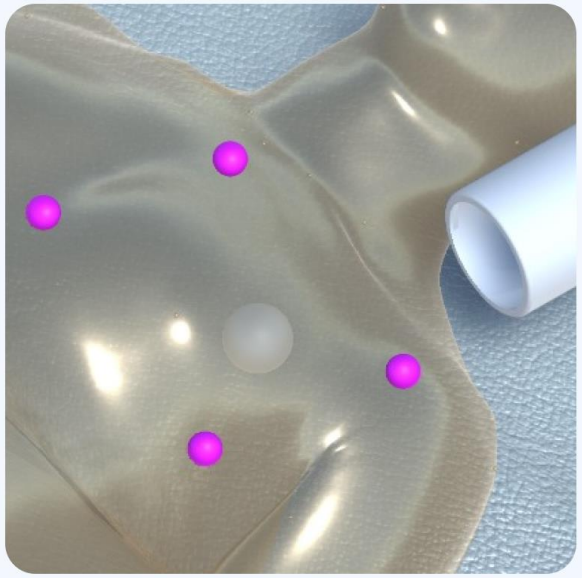
LUMO

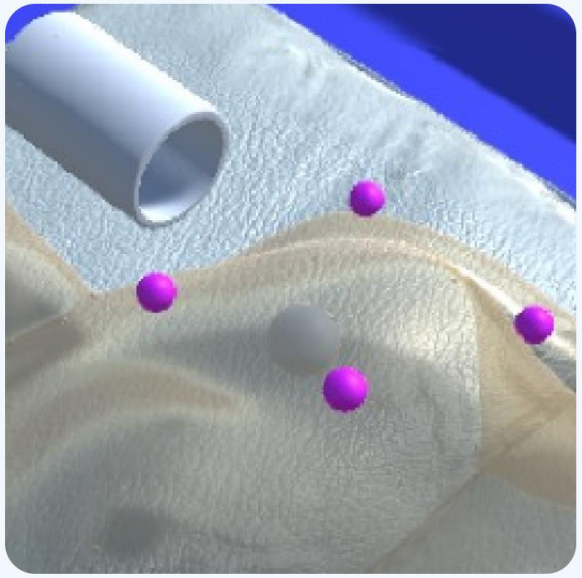
Search

Deko

- Dashboard
- Appointment
- Doctors
- Departments
- Patients
- LUMO







Patient ID: 12384640834757

LUMO Status

LUMO no.	5322
Calibration	Ok
Battery	92%
Connectivity	Good

Scan in Progress

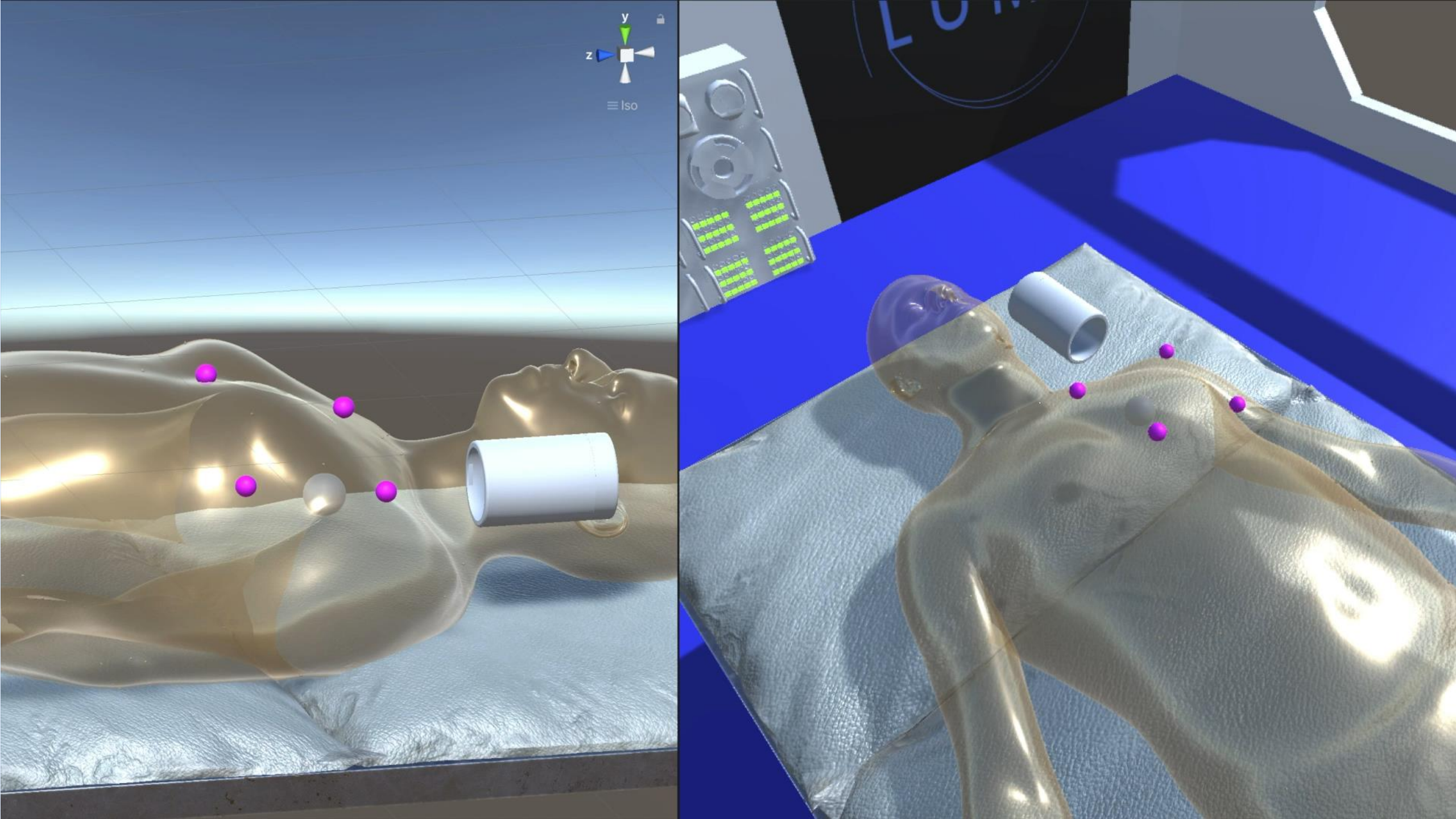
See Schedule

Assigned Doctors

Thoms D — Abailable

+ Register Patients

Settings


y
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Iso

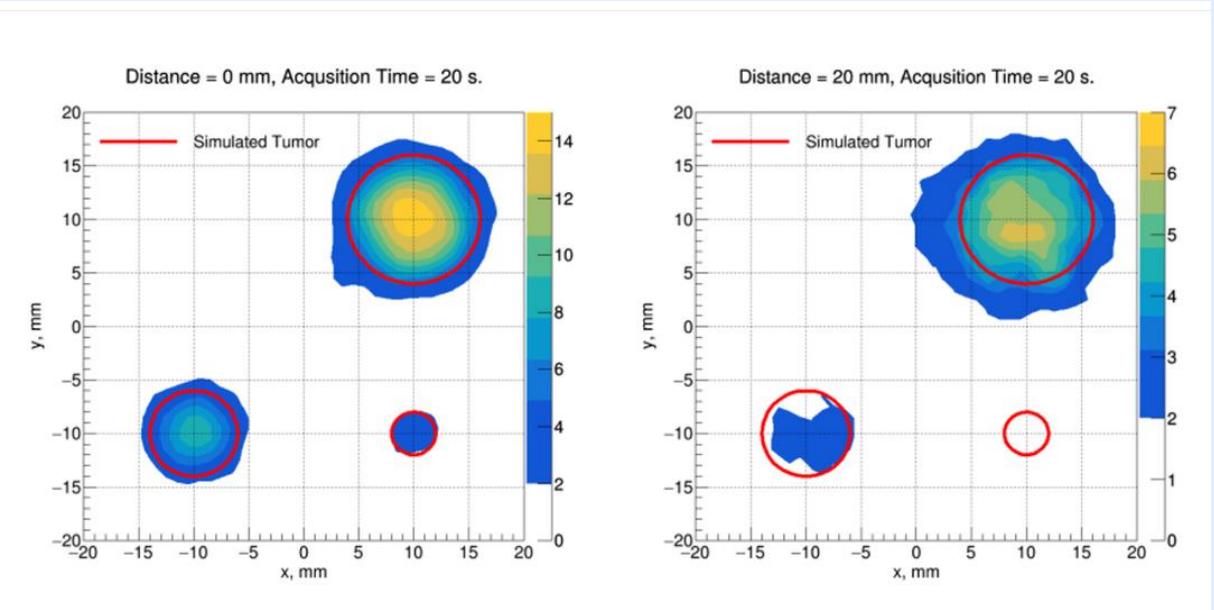
THE BASIS: POSICS2

THE BASIS: POSICS2

- Detection of tumours

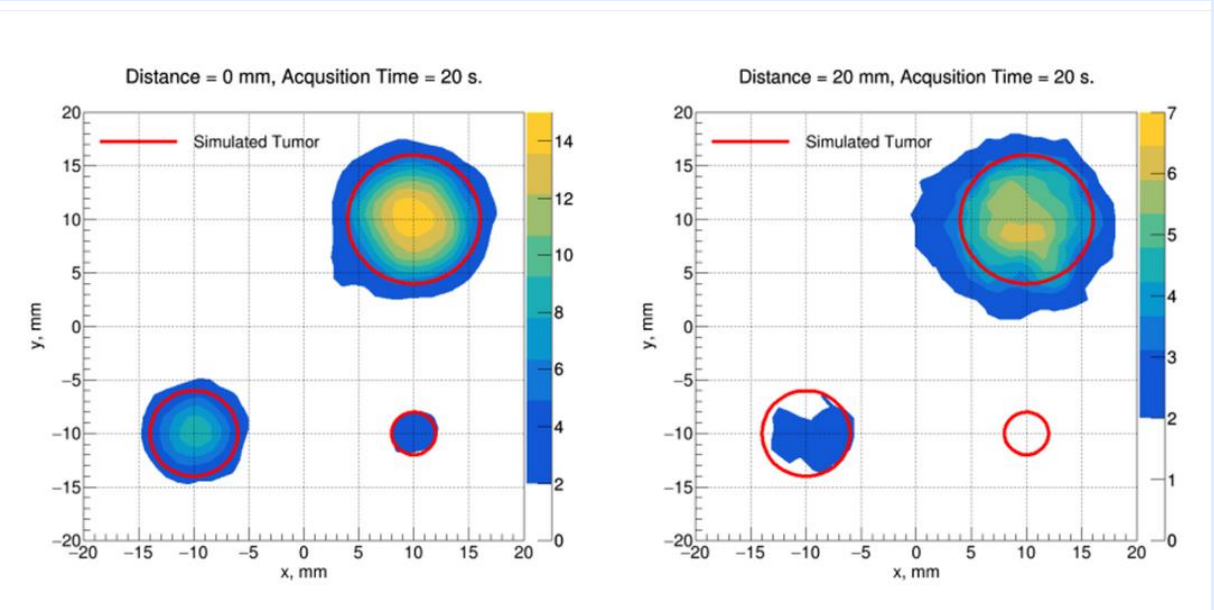
THE BASIS: POSICS2

+ Detection of tumours



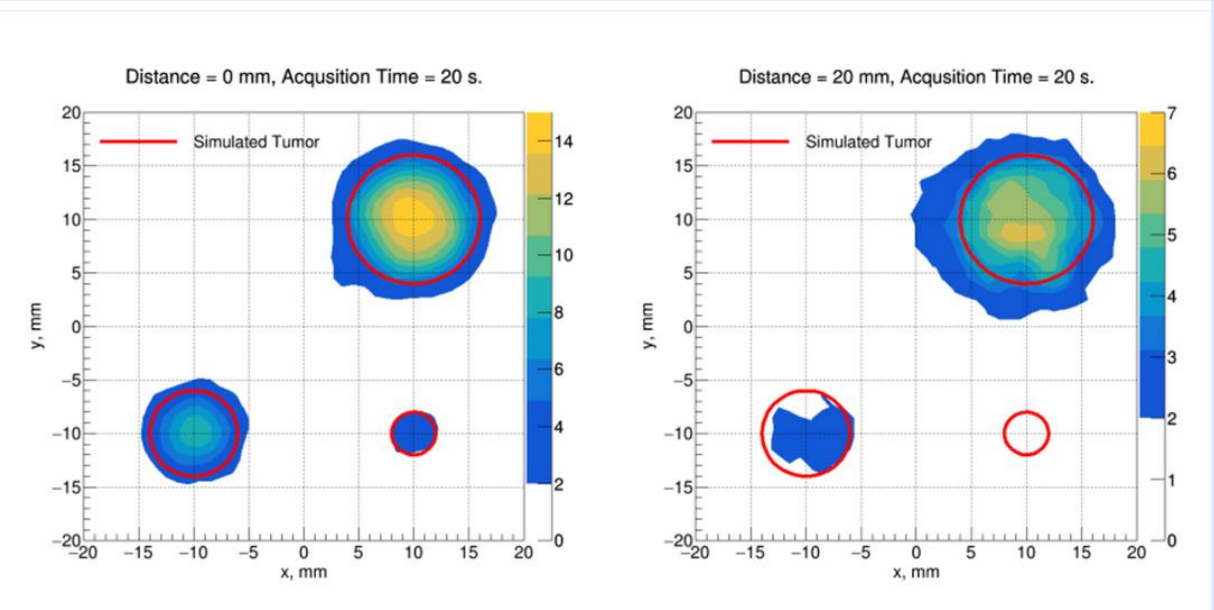
THE BASIS: POSICS2

+ Detection of tumours
+ Non invasive



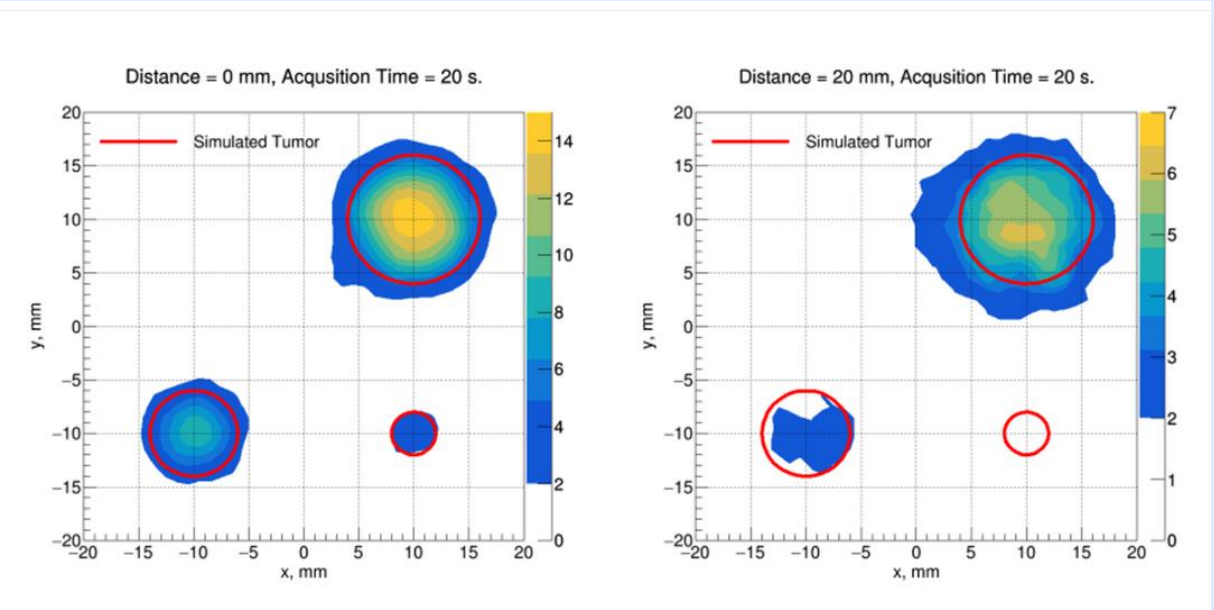
THE BASIS: POSICS2

- Detection of tumours
- Non invasive
- Portable



THE BASIS: POSICS2

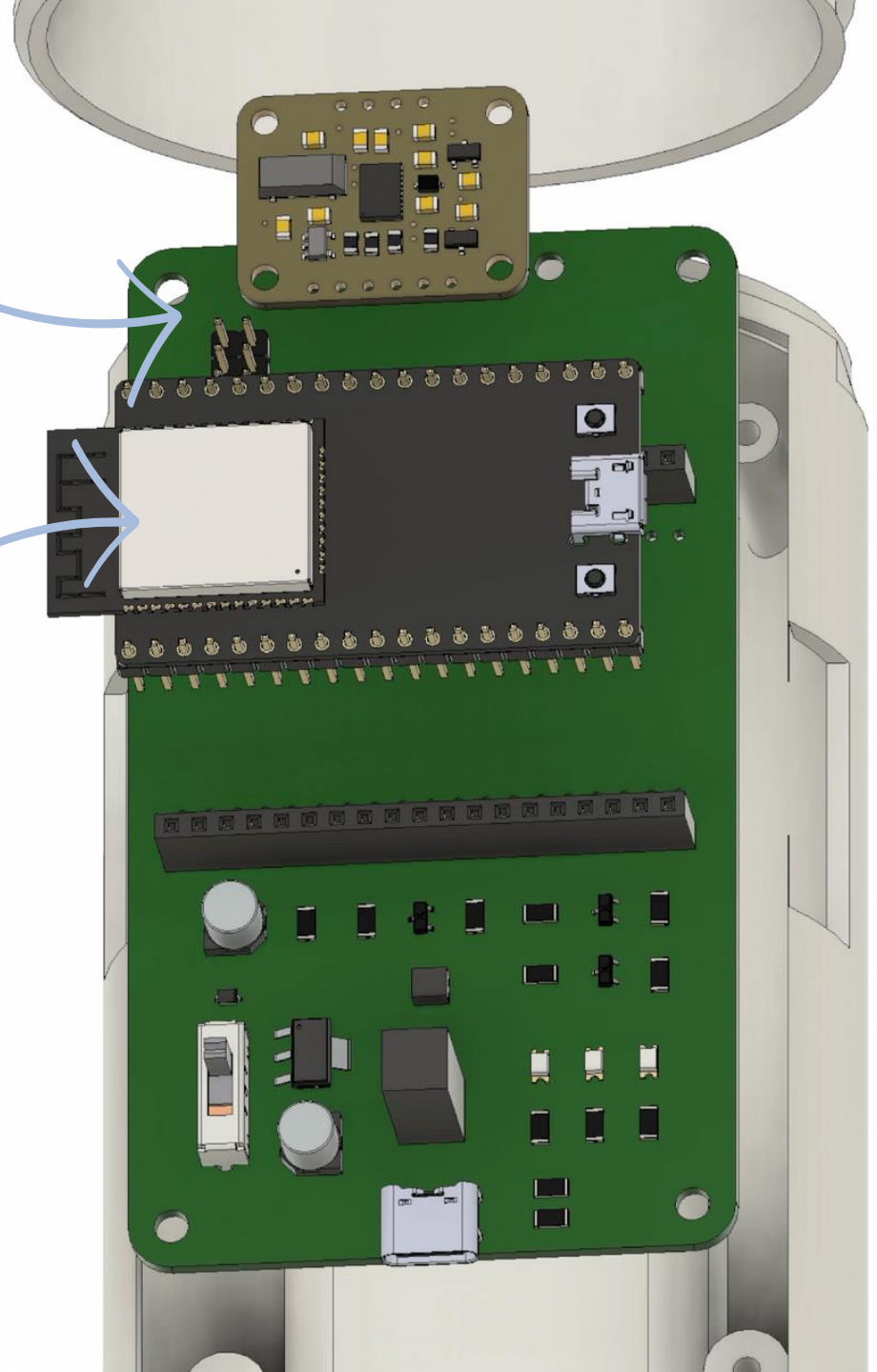
- Detection of tumours
- Non invasive
- Portable
- Lower cost



POSICS2

IMU

RF Module



SOCIAL IMPACT OF LUMO

Patients

Doctors

Hospitals

ROADMAP

Seed Funding

8$ million

Clinical Trials

European Device Certification CE

Geographic Expansion

Funding Targets

Research Partners

ATTRACT

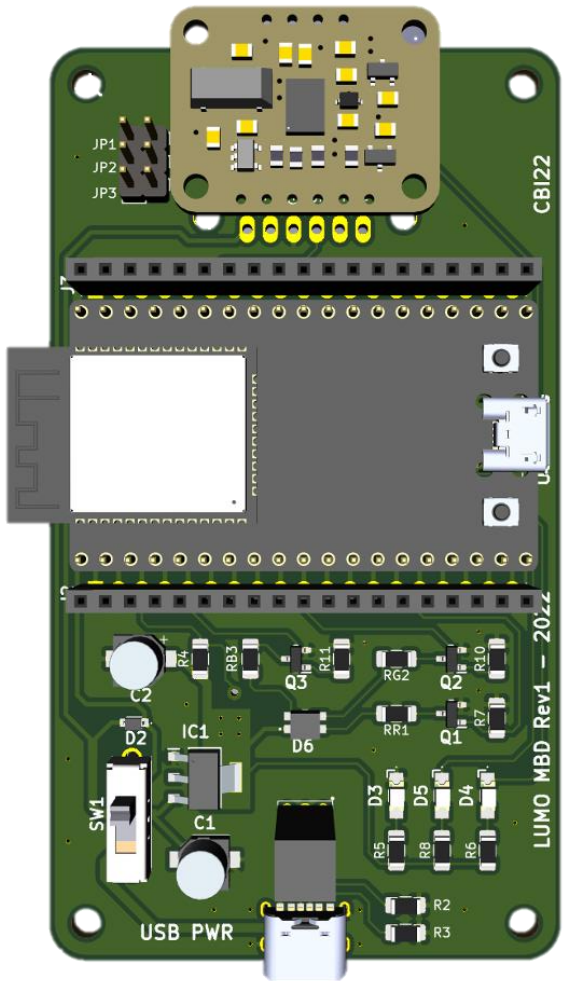
CERN

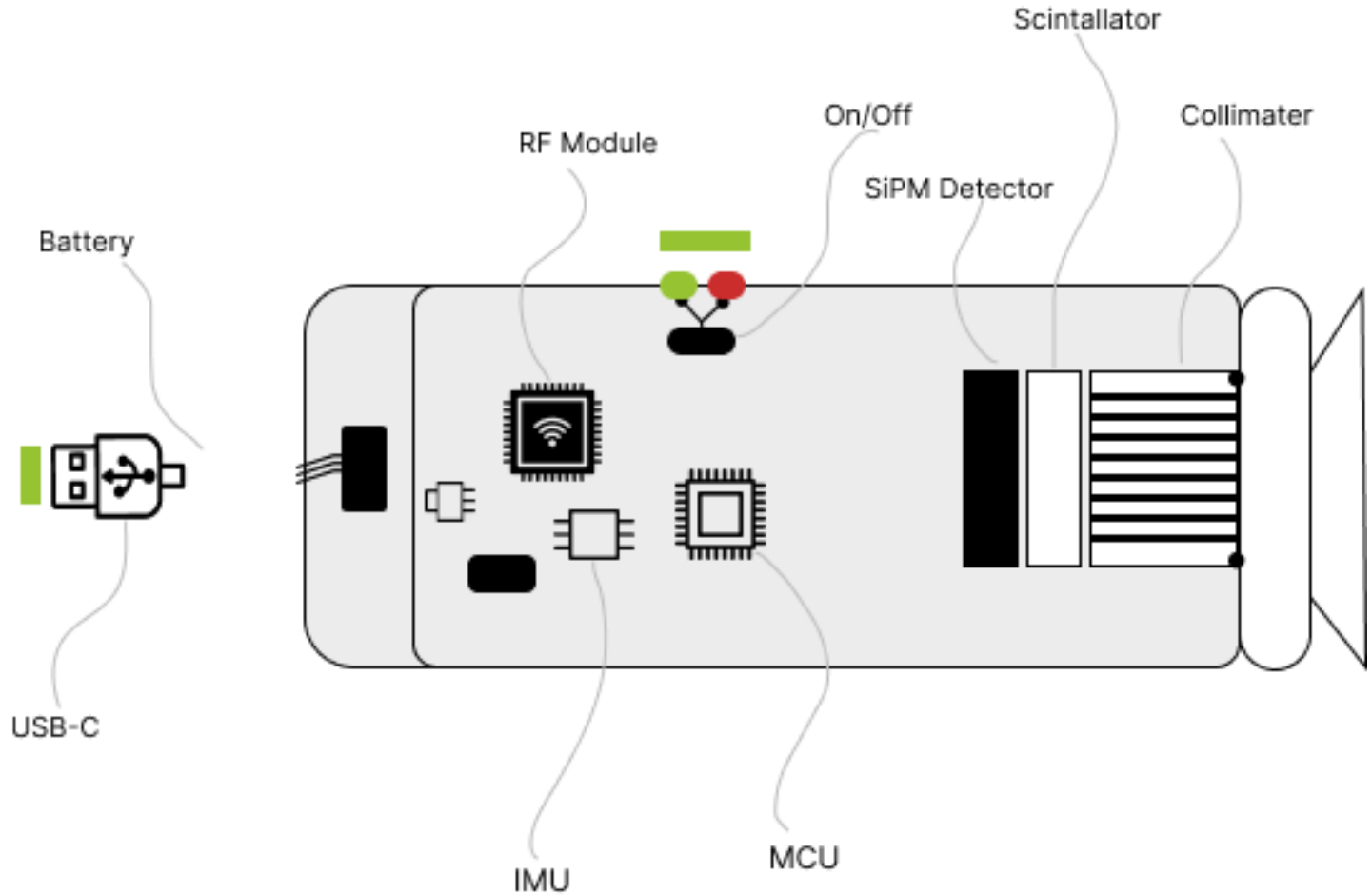
esade

UPC UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

IED

Appendix: More technological details

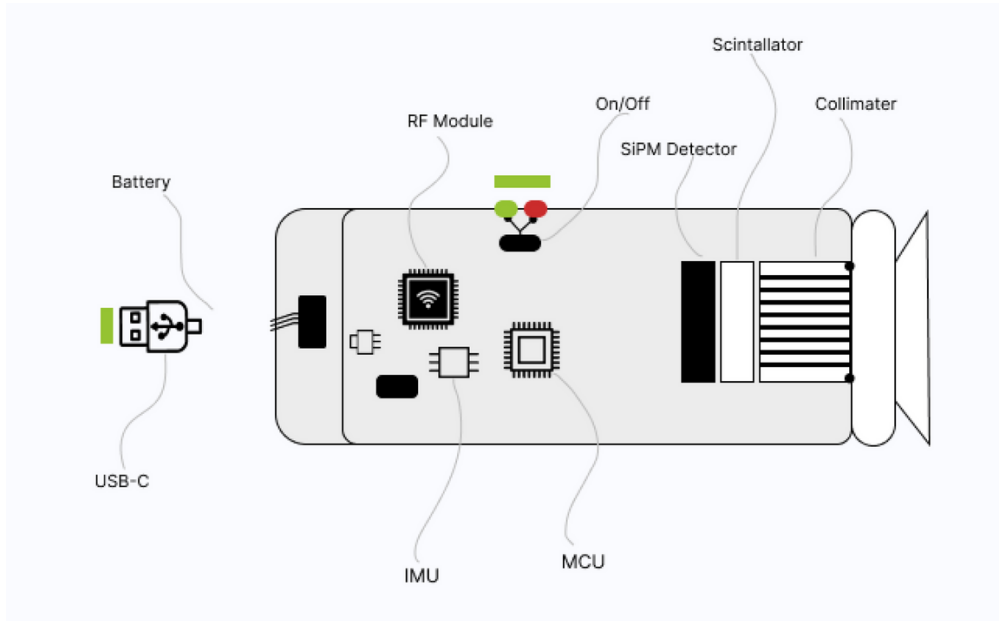




Appendix: More technological details

Collecting the data

- The Collimator, Scintillator and SiPM detector are included in the POSICS2 camera. Together, they detect gamma and beta rays. This is useful for differentiating between tumorous cells and healthy cells.
- The IMU contains an accelerometer, magnetometer and gyroscope which in combination with sensor fusion algorthms is capable of precisely determining the orientation of the device in real time.
- The device is based arround an MCU and an RF module which transfer the orientation, position and image data to the PC. The device has a button and a LED to serve as a minimal user interface.



Transmission

As LUMO is wireless device, the RF module can be configured as a WIFI access point or client, and it connects to the computer using a custom protoccol over TCP.

Device Details

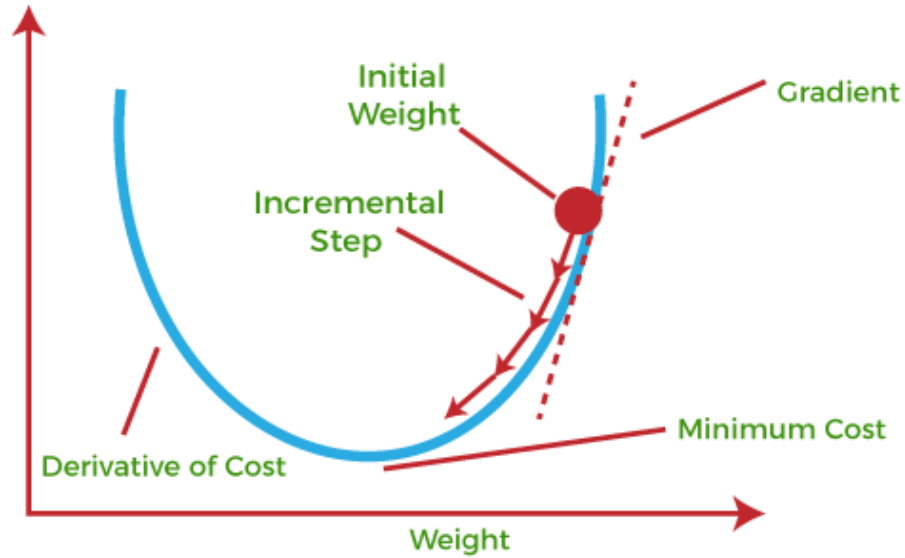
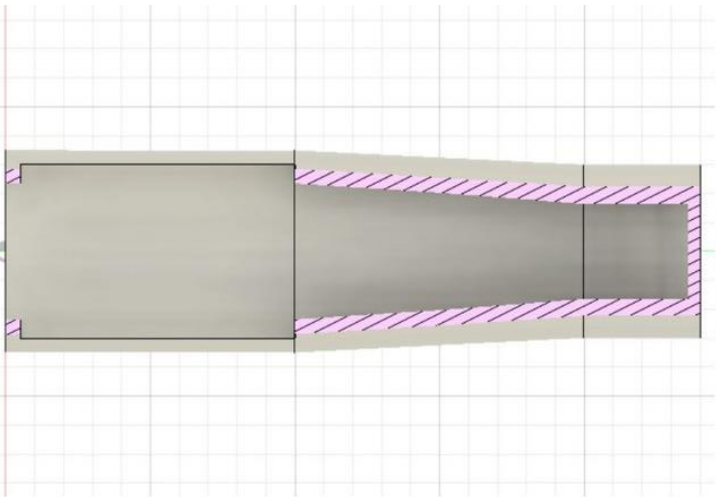
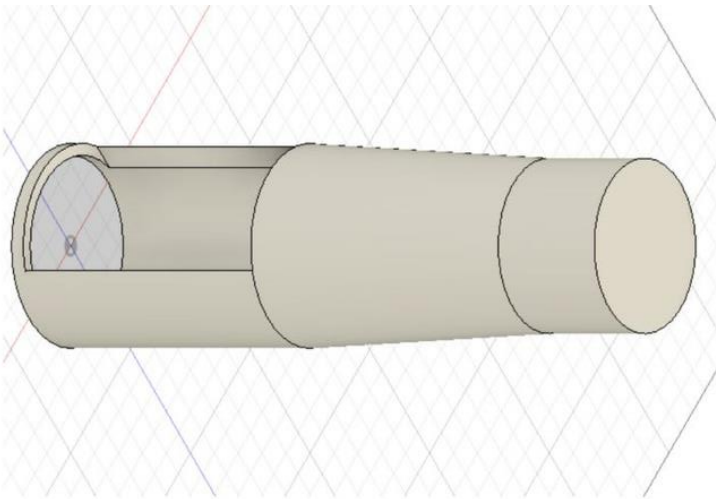
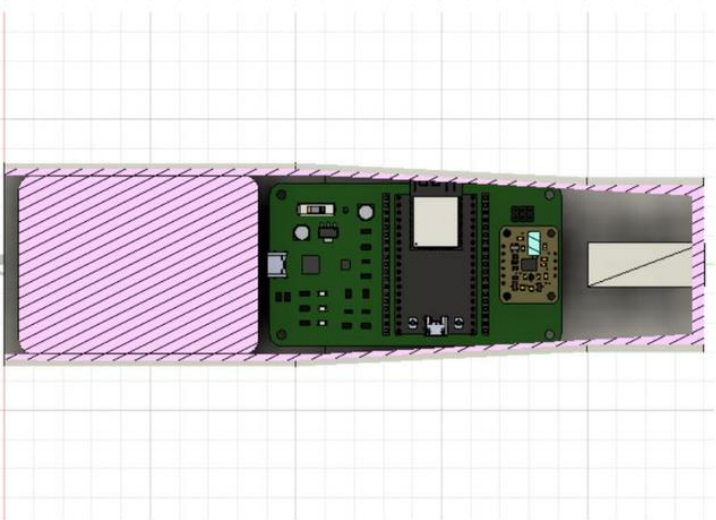
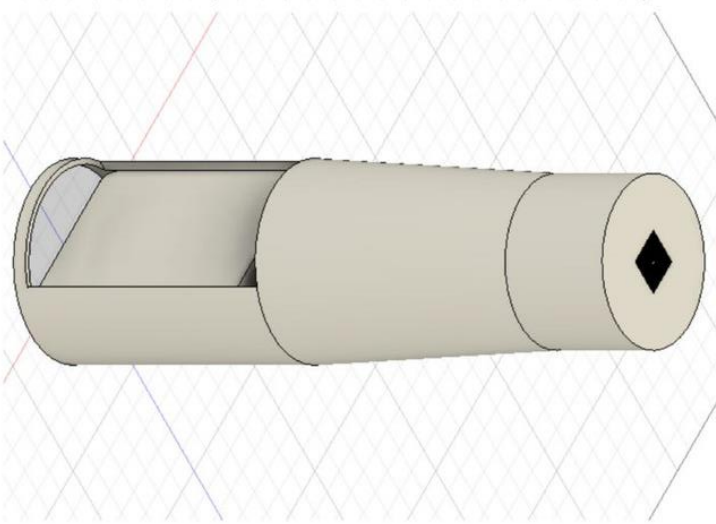
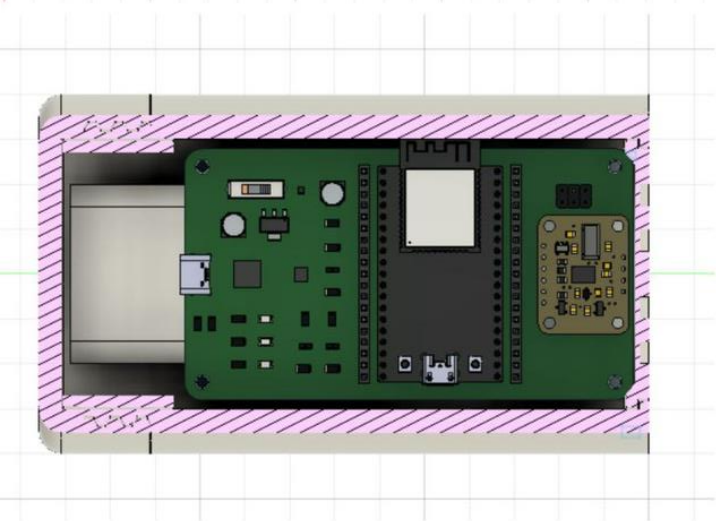
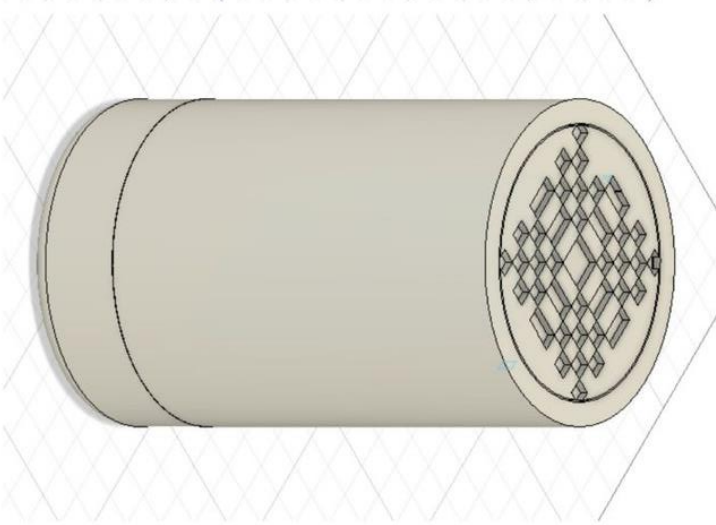
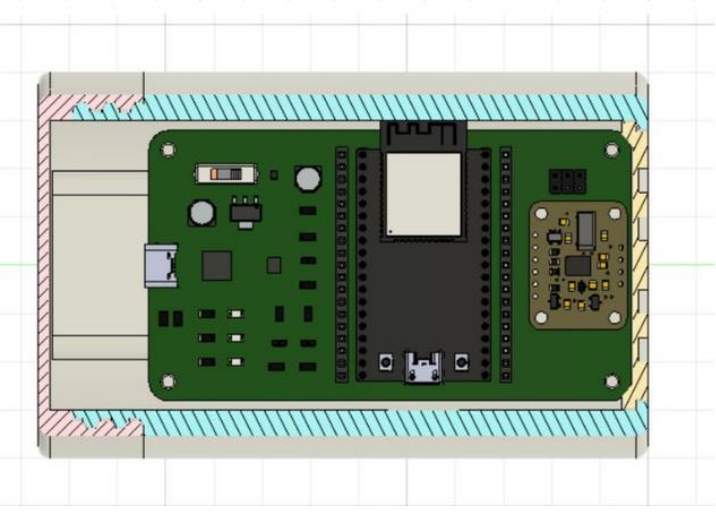
- Battery
- The USB-C connector is necessary to charge the device.
- There is a LEDs that indicates the state of the device.

Scintallator

Appendix: More technological details

Software

- It computes the projection of the points captured by the POSICS2 camera and represents them both in 3D and in a 2D scatter.
- Then, once it receives some collisions it calculates the mean and shape of that scan, and after a beep, the camera should moved to another position.
- From every scan, the software extracts a line which passes through the mean and goes in the perpendicular direction of the plane of the camera.
- Once some lines are computed, it finds the point at minimum distance of all the lines. That's where the tumour will be located.
- Next, with the Gradient Descent algorithm we improve the position.
- Lastly, we plot the 3D representation of the tumour in the digital body.
- At the moment, in order to capture the points accurately, the scanned part will be covered with a grid that divides the space.



APPENDIX: PROTOTYPING PROCESS