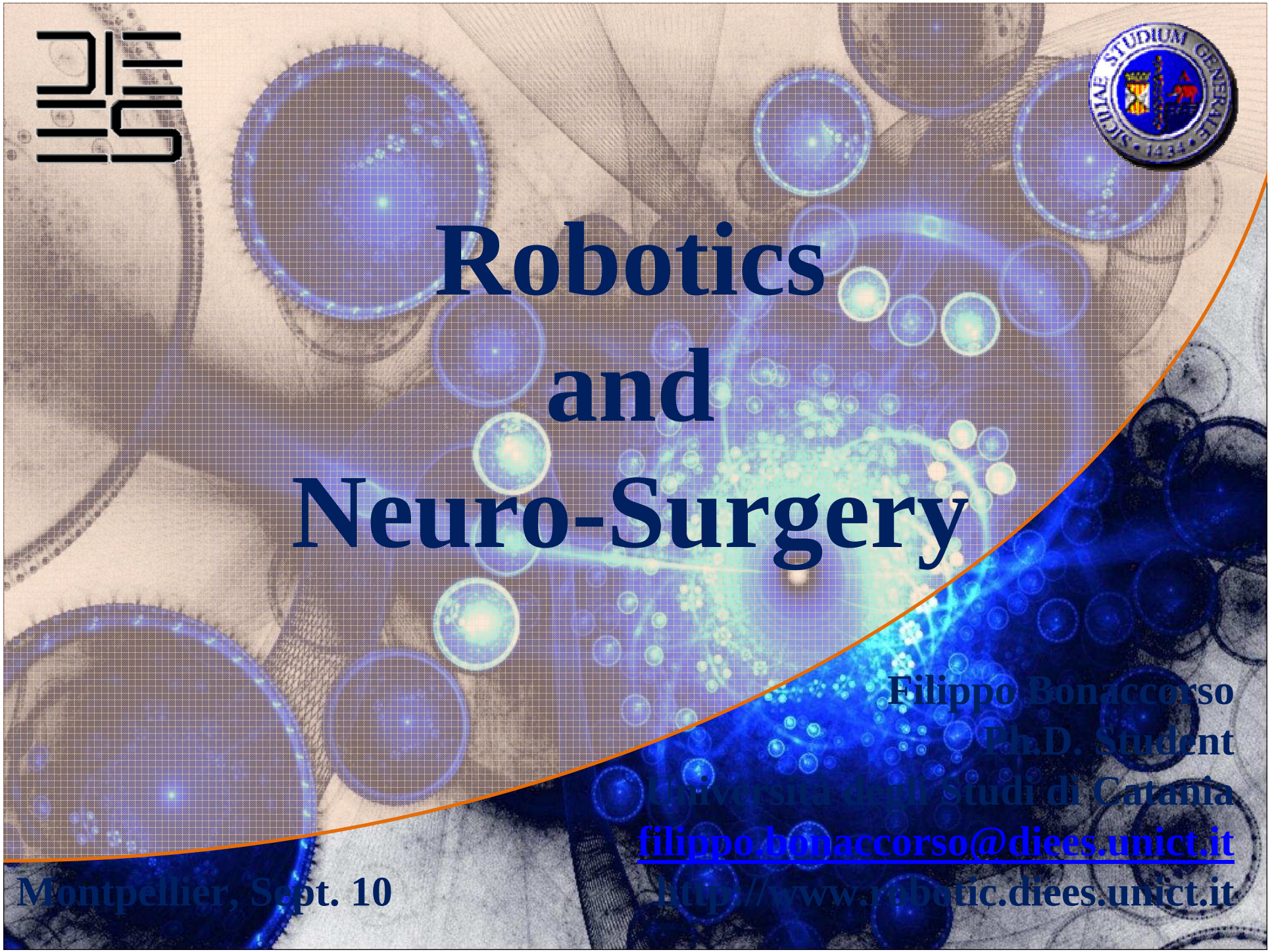

Robotics and Neuro-Surgery

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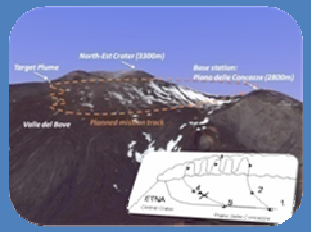
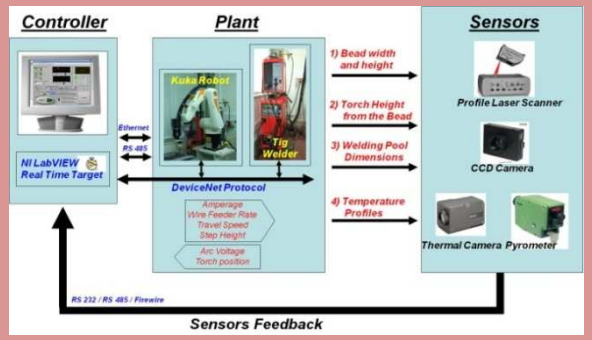
http://www.robotic.diees.unict.it

Montpellier, Sept. 10

SERVICE ROBOTIC GROUP



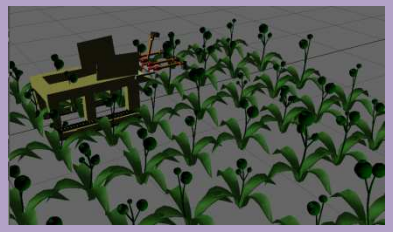
Volcanic Inspection



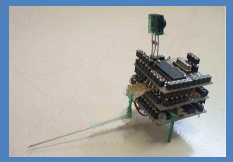
Industrial applications

eurobot

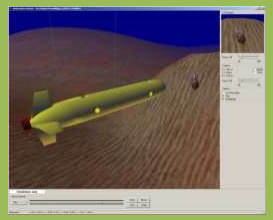
Educational



Agriculture

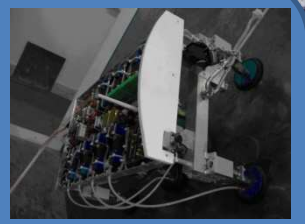


Walking



Underwater

Medical



Climbing

TARGETS

Develop techniques and instruments to perform D.B.S. (Deep Brain Stimulation) implants with robotic manipulator.

In detail different tools are under development to perform:

- Automatic planning of the operation
- Automatic targeting of the device

- Reduce the influence of human errors
- Increase precision

The project is in collaboration with

Dr. Paolo Mazzone

CTFU Alesini Hospital, Rome.

TARGETS

The devices to be implanted are used for deep brain stimulation in order to treat Parkinson disease

A great precision is required to target the device in order to both have the desired results and to avoid damage on the cardiovascular system of the patient.

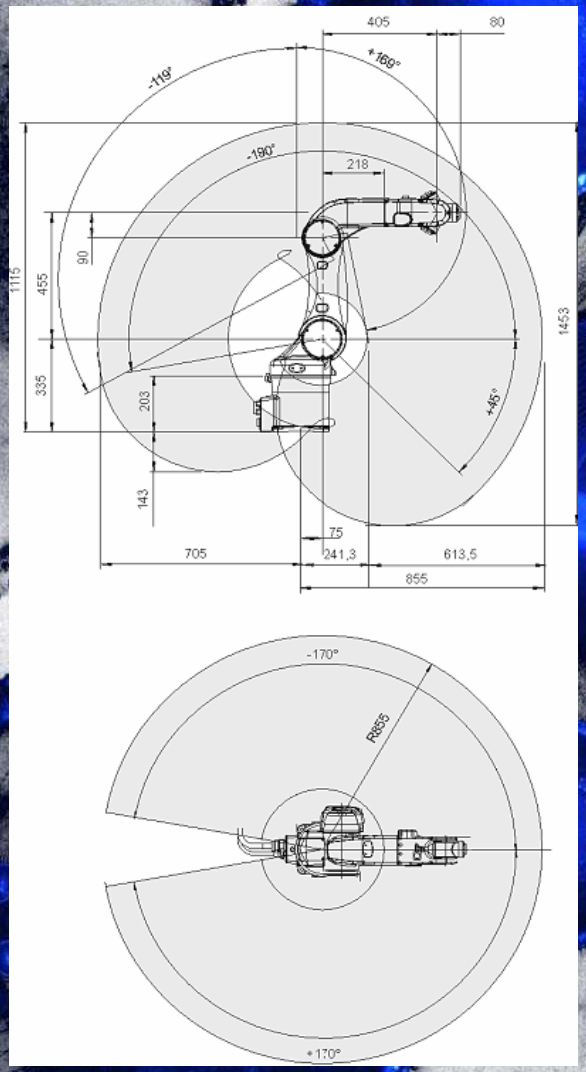
To do so pre-operative imaging technique, such as CT and MR, are used to plan the robot trajectories.

Now different approaches of the robot to the patient and different robot structure are under investigation to find the better way to obtain the result.

KR5 sixx R850

Axes:	6
Precision:	≤ +0,03 mm
Weight:	29 kg
Load:	5 kg
Max Distance:	850 mm
Max speed	7,8 m/s

KR5 sixx R850

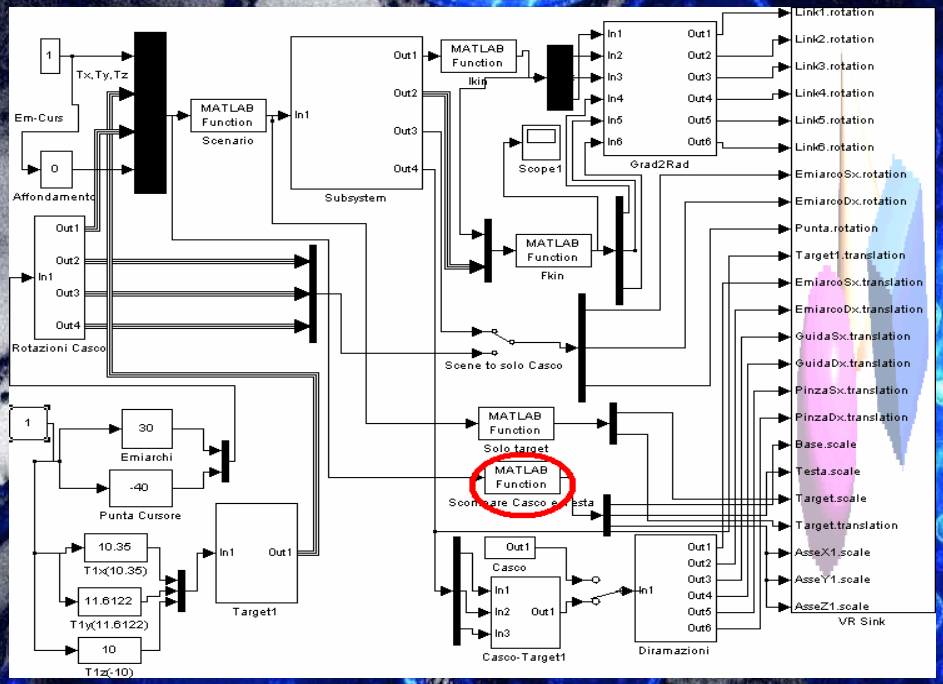


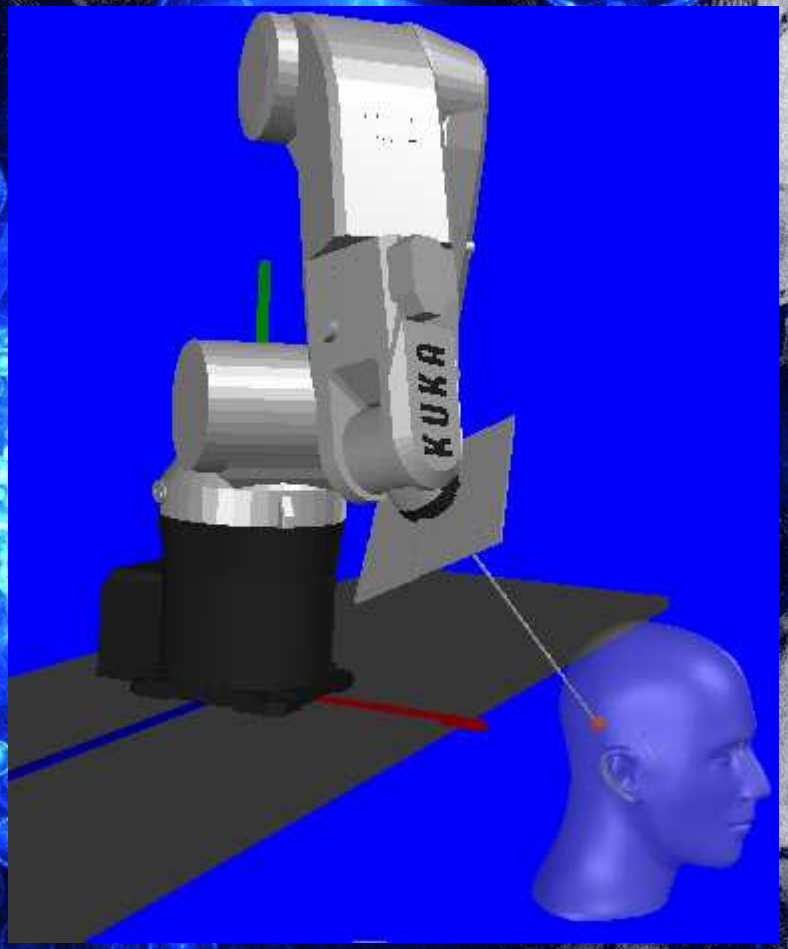
To plan the operation and to target the device some preliminary study has to be done.

These are canonical tasks of robotic manipulator:

- Direct Kinematics
- Inverse Kinematics

SIMULATIONS





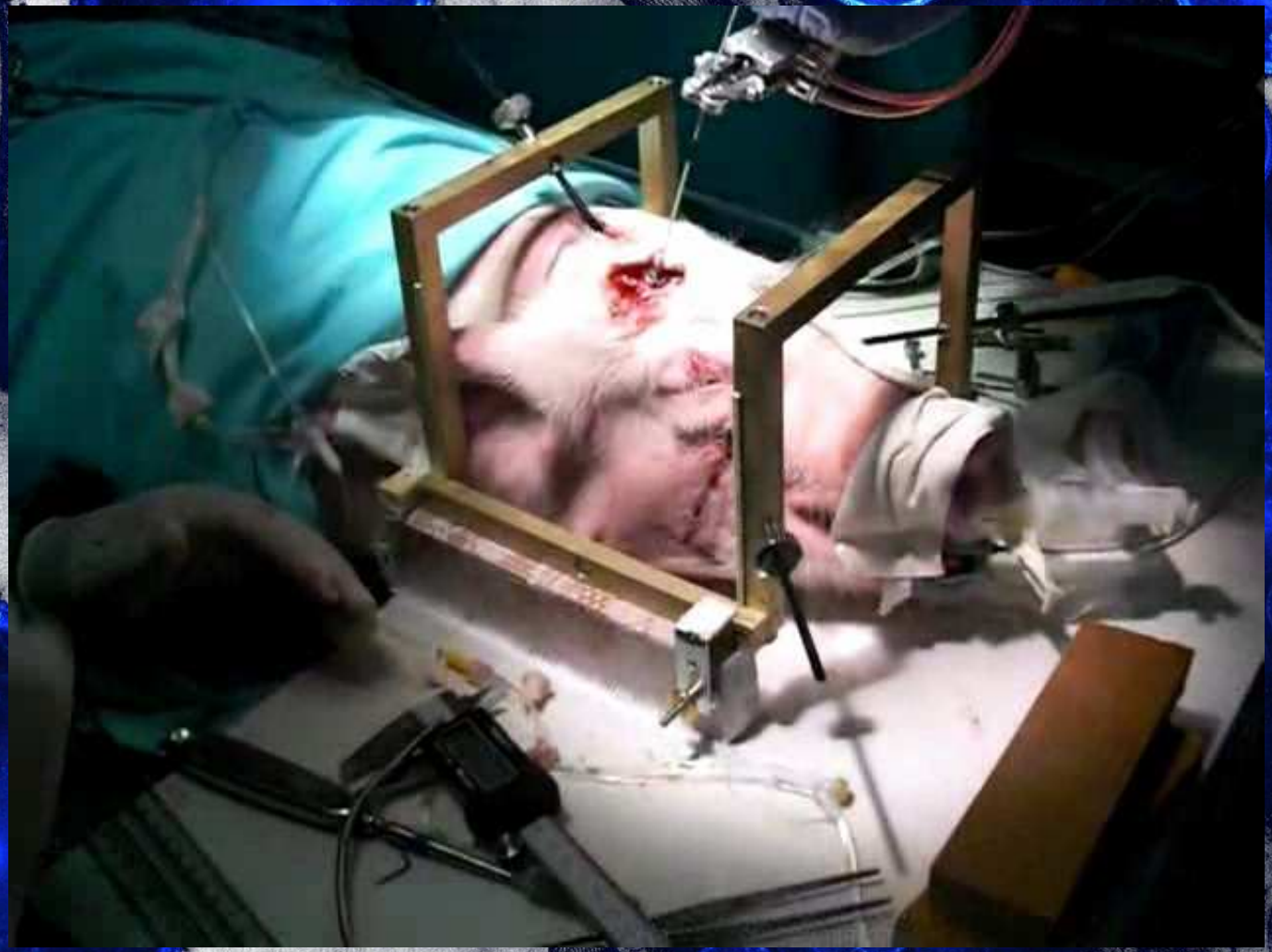
PRELIMINARY TRIALS

IMPLANT TESTS TRIALS

Last October, after some bureaucratic tasks, some implant tests have been performed on pigs.

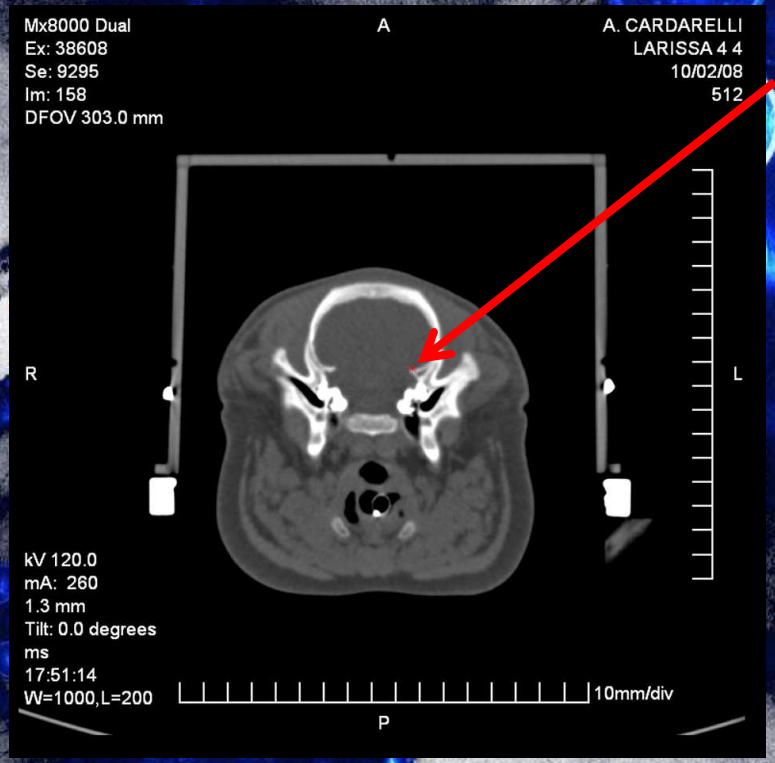
In collaboration with:
Prof. S. Cozzolino
Centro di biotecnologie
AORN Cardarelli
Napoli

IMPLANT TESTS TRIALS



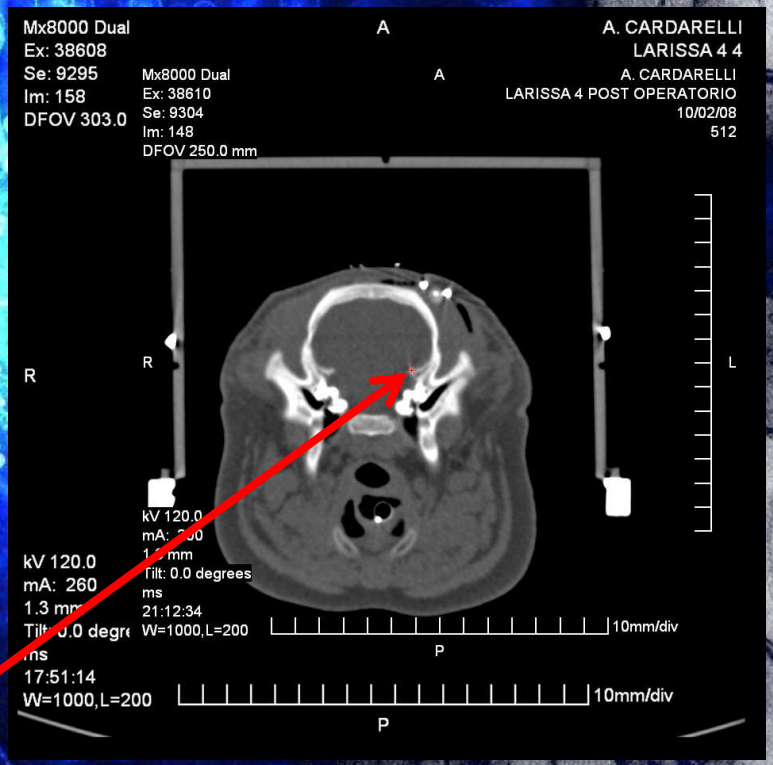
IMPLANT TESTS RESULTS

Post-operative data have shown that the target has been reached.

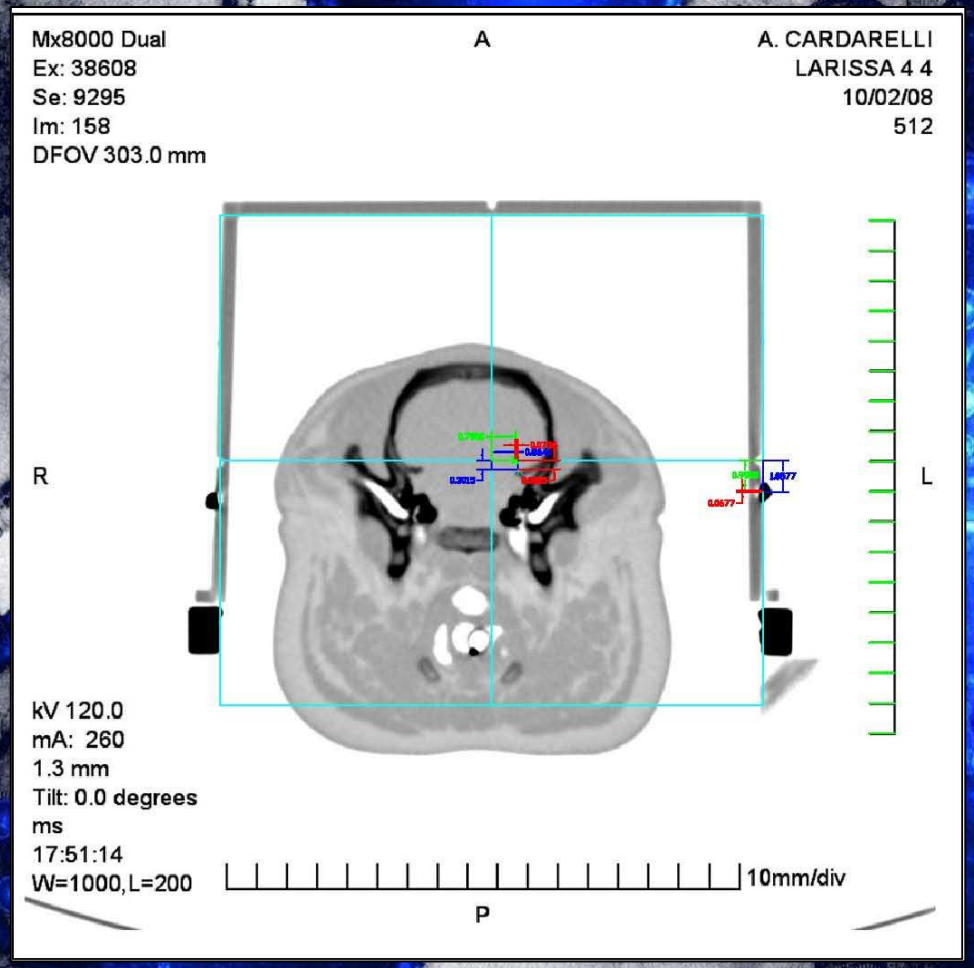


Before

After



IMPLANT TESTS RESULTS



Post-operative data have shown an error smaller than 0.5 millimeters

IN PROGRESS

- Use of 3D markers for target localization instead of external mechanical devices like the helmet.
- Simplified User Interface.
- Operation planning through absolute reference system.