



LA - ROSES

*Laser Assisted Robotic Surgery of the anterior
Eye Segment*

Story Board

LA ROSE

The text "LA ROSE" is written in a black, cursive script. The letter "O" is replaced by a red rose with green leaves and a stem. The letter "E" is also replaced by a red rose with green leaves and a stem.



European Clearing House for Open Robotics Development Plus Plus

LA - ROSES

Laser Assisted Robotic Surgery of the anterior Eye Segment



Timing
0 – 2.5 s

LA ROSE

The Team:

Ekymed Srl

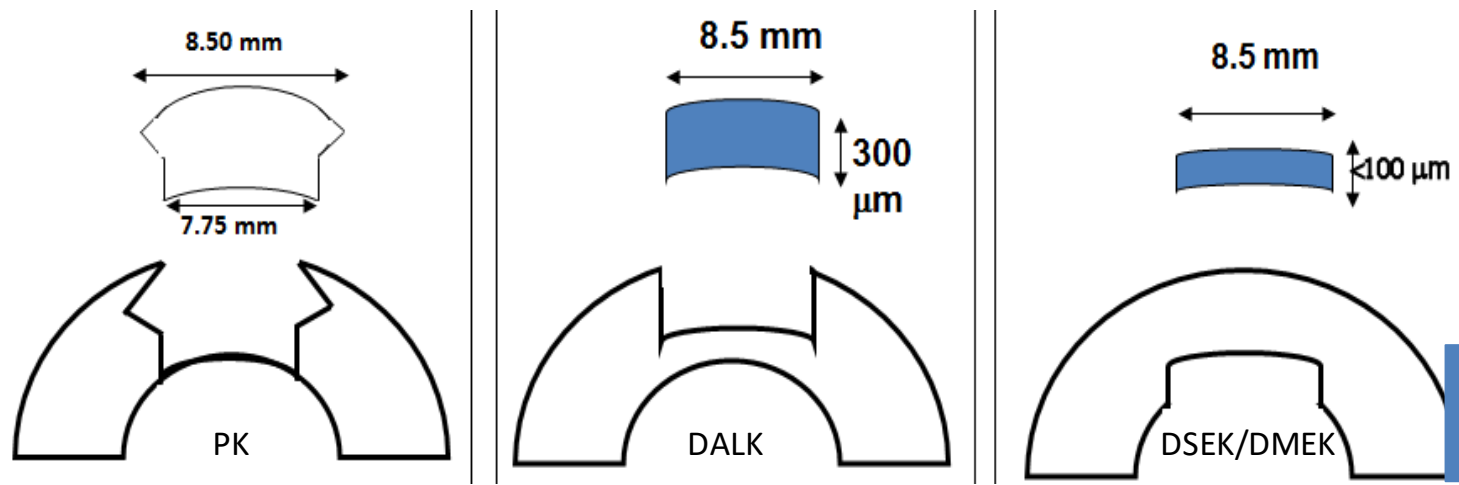
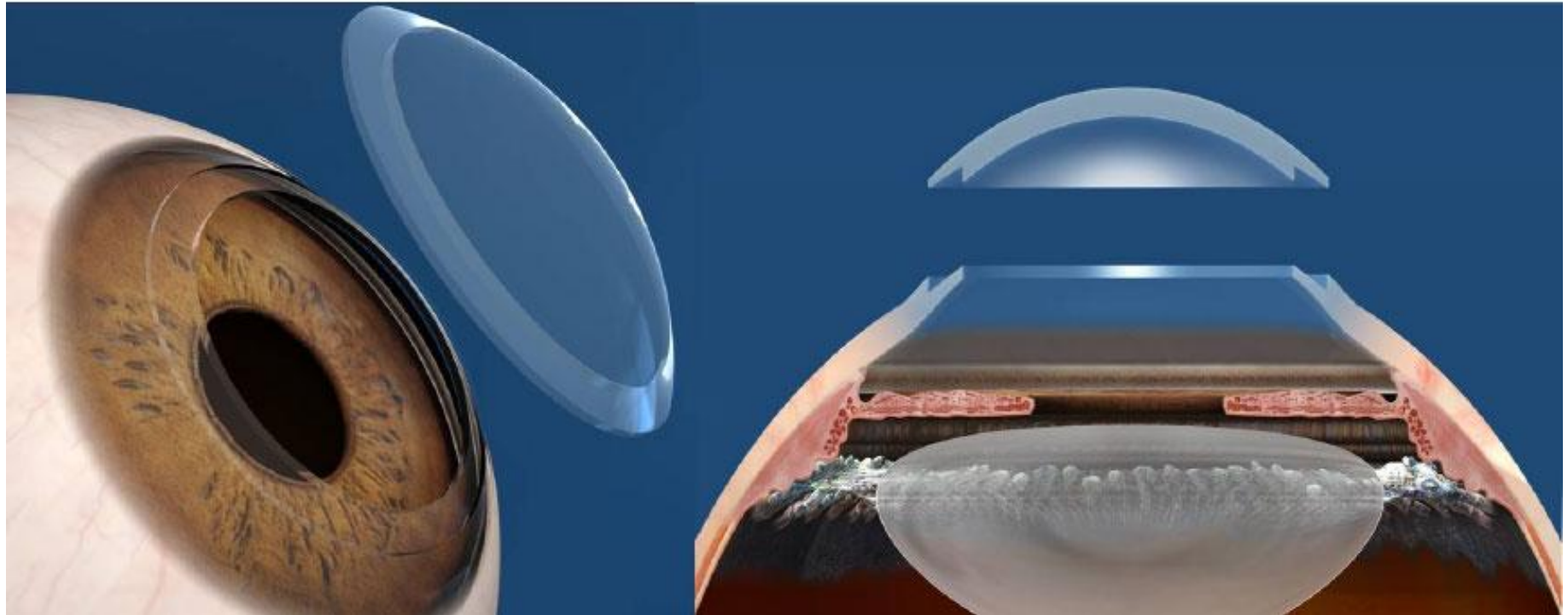
Fastenica Srl

IFAC - CNR



Timing
2.5 - 5 s

Cornea transplantation

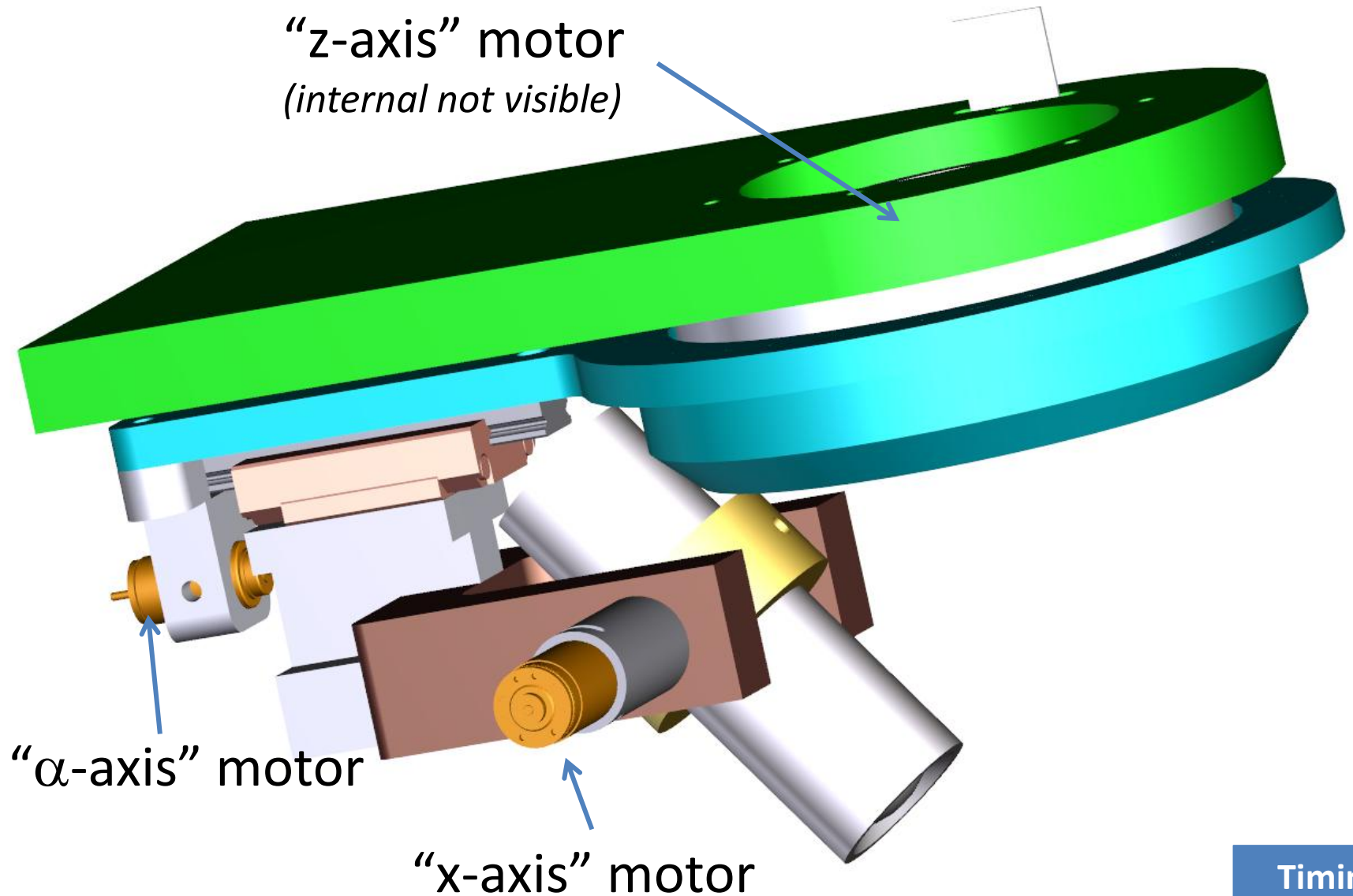


Timing
5.5 – 8.5 s

Objective of the project

- to develop a “proof of concept” of a robotic platform for laser eye surgery, cornea transplantation
- the aim of LA-ROSES project is to:
 - implement a robotic platform for assisting eye surgical operations. The robotic platform consists of a 6 degrees of freedom robotic arm system and a mounted vision system allowing the robotic arm to be driven using a visual servoing approach
 - implement a revised end-effector able to accommodate the applicator handpiece to fix the distance laser diode
- increase the precision of the laser-induced suture of the cornea from 1-2 mm (laser manually handled) to 0,01 mm

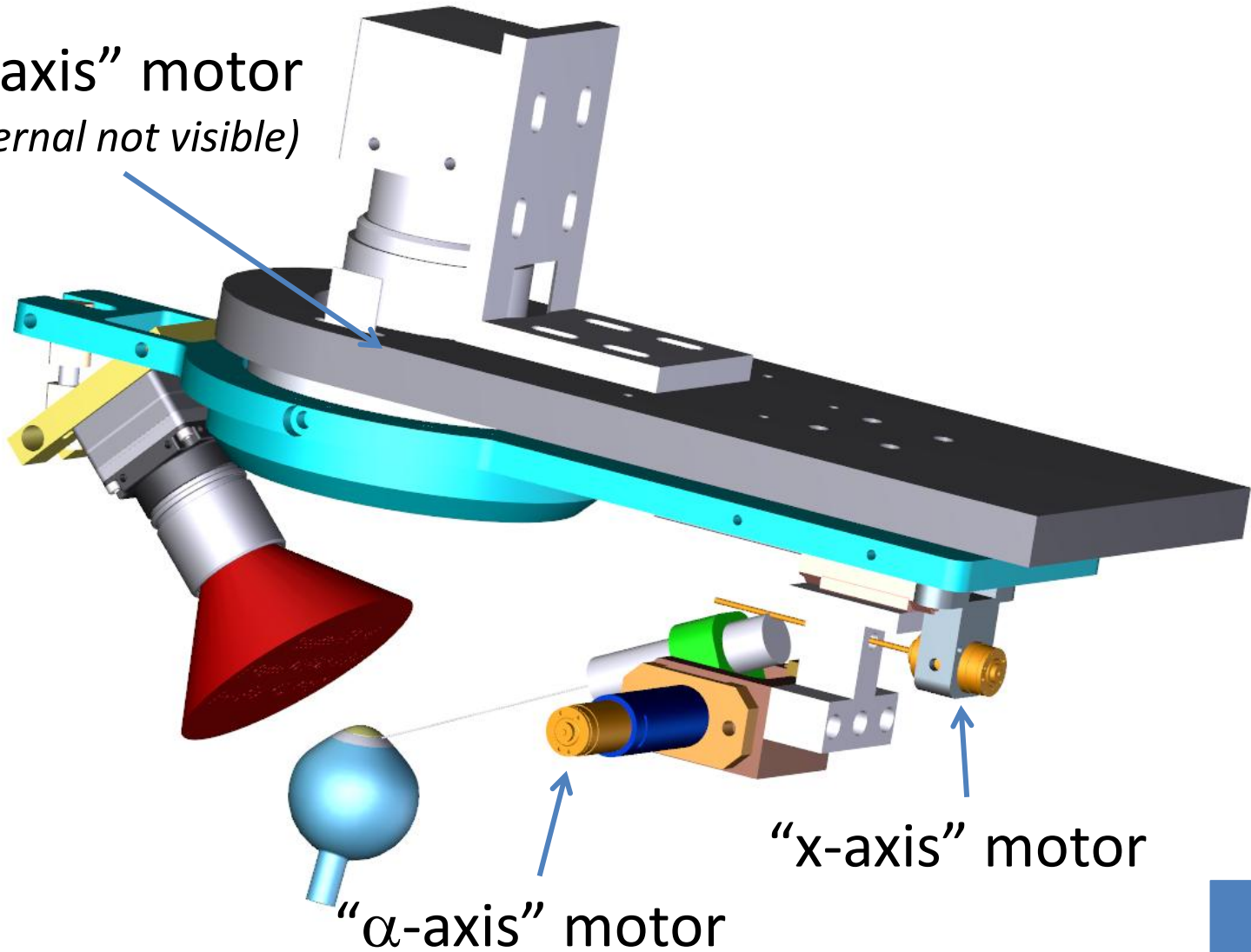
End-effector design 1st version



Timing
13.5 – 15.5 s

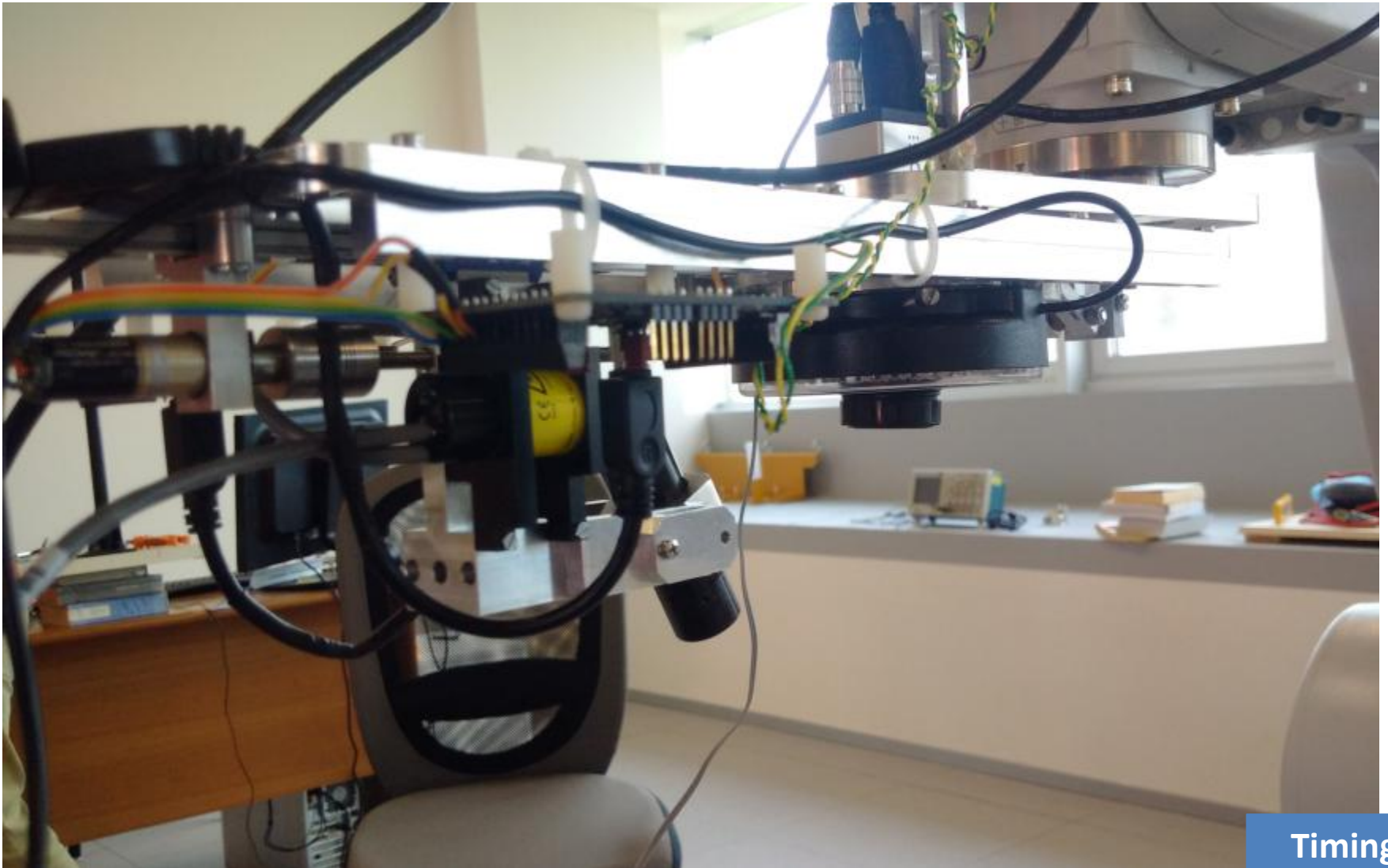
End-effector design 2nd version

“z-axis” motor
(internal not visible)



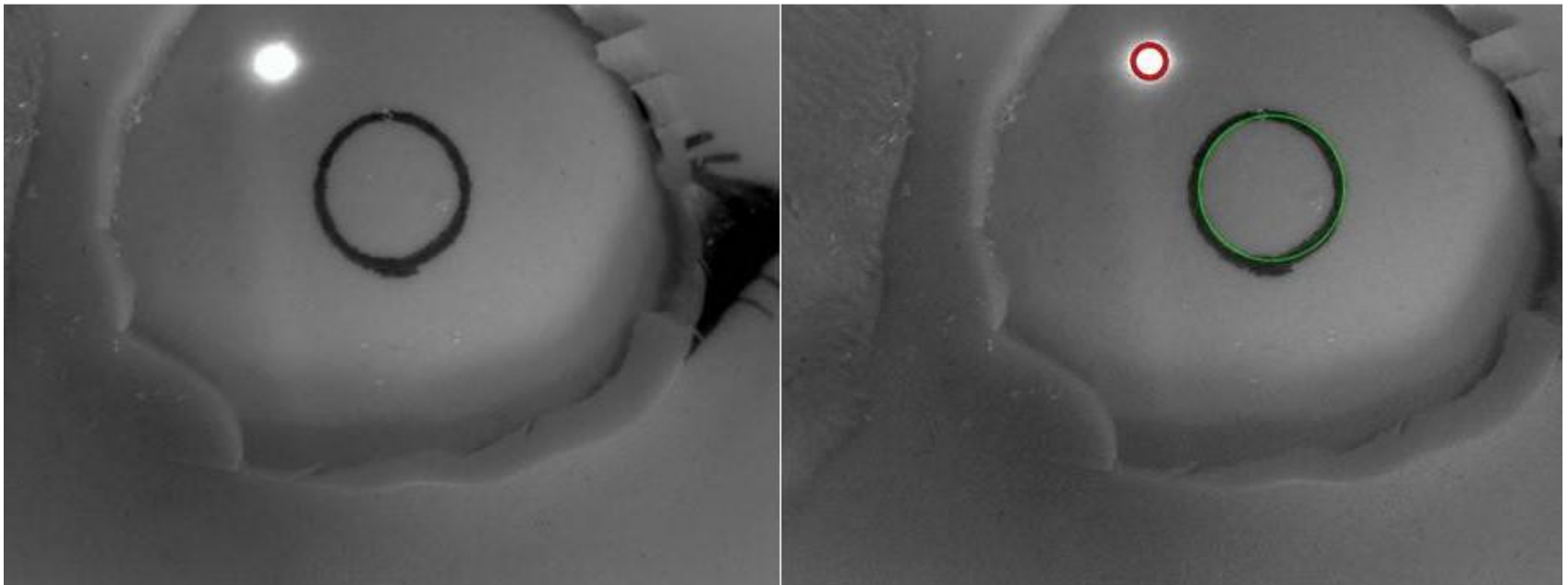
Timing
15.5 – 17.5 s

First release of LA-ROSES end-effector realization and assembly



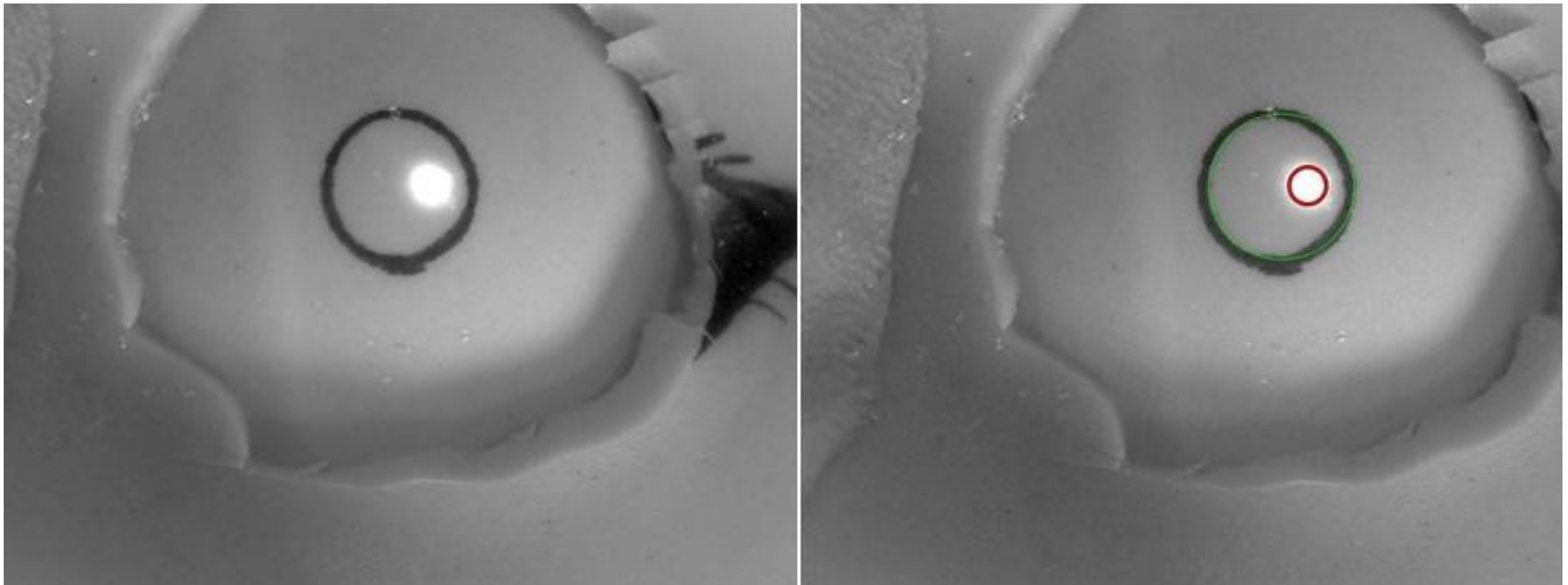
Timing
17.5 – 19.5 s

1st Tracking Test



Timing
19.5 – 20.5 s

1st Tracking Test



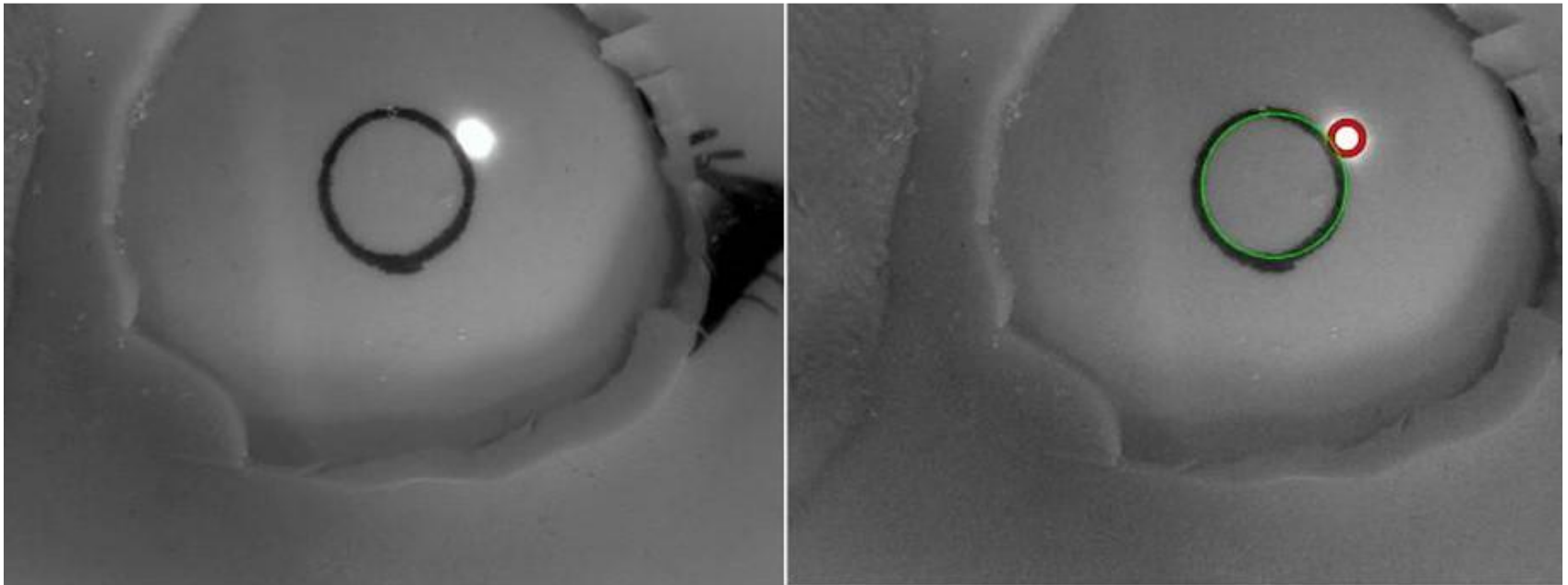
Timing
20.5 – 21.5 s

1st Tracking Test



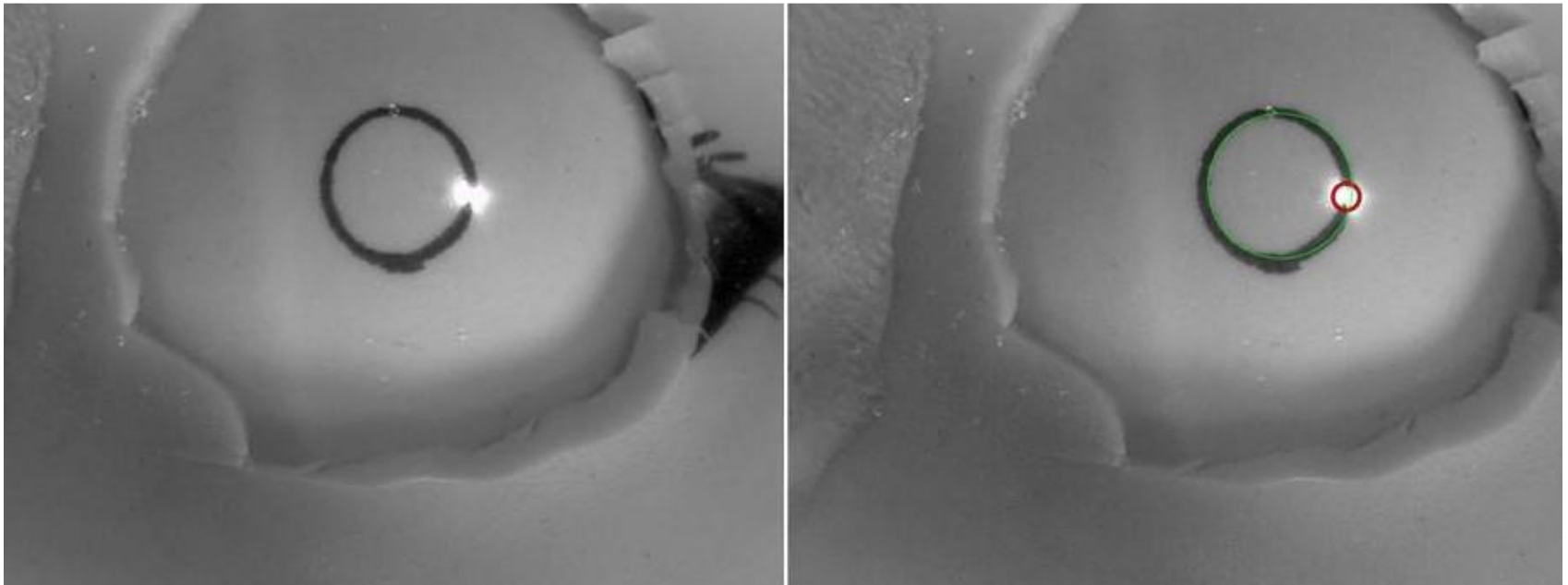
Timing
21.5 – 22.5 s

1st Tracking Test



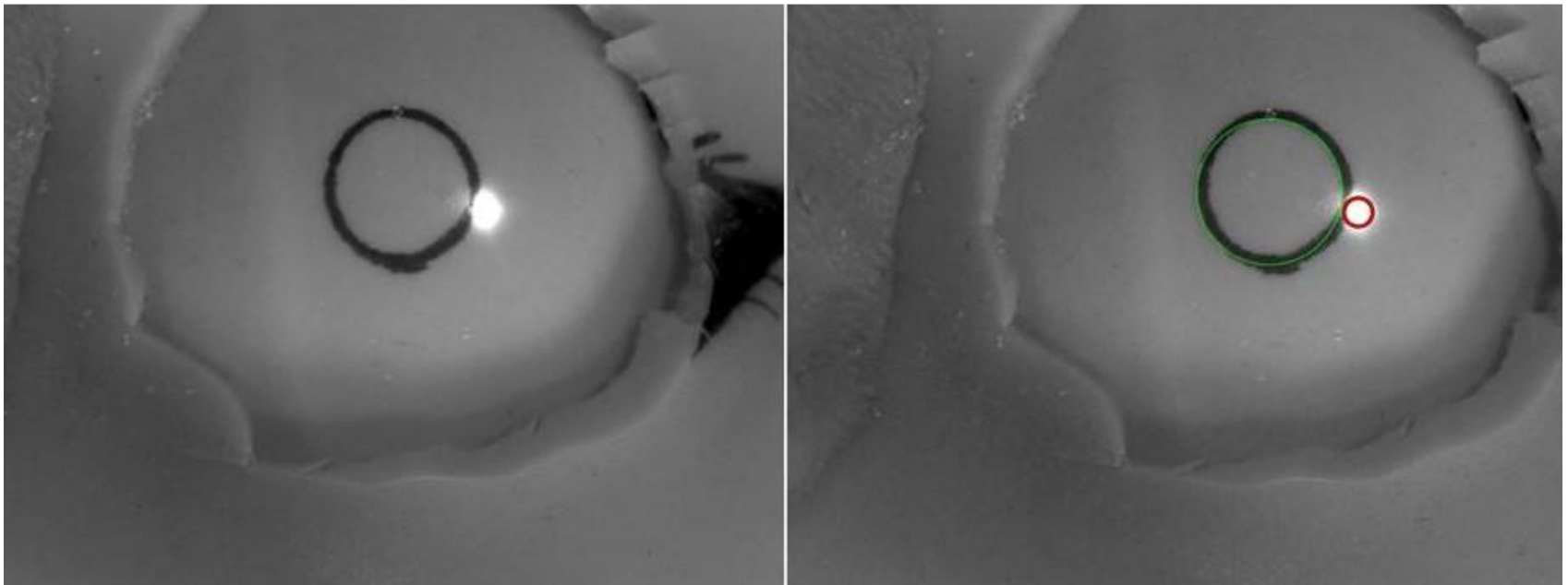
Timing
22.5 – 23.5 s

1st Tracking Test



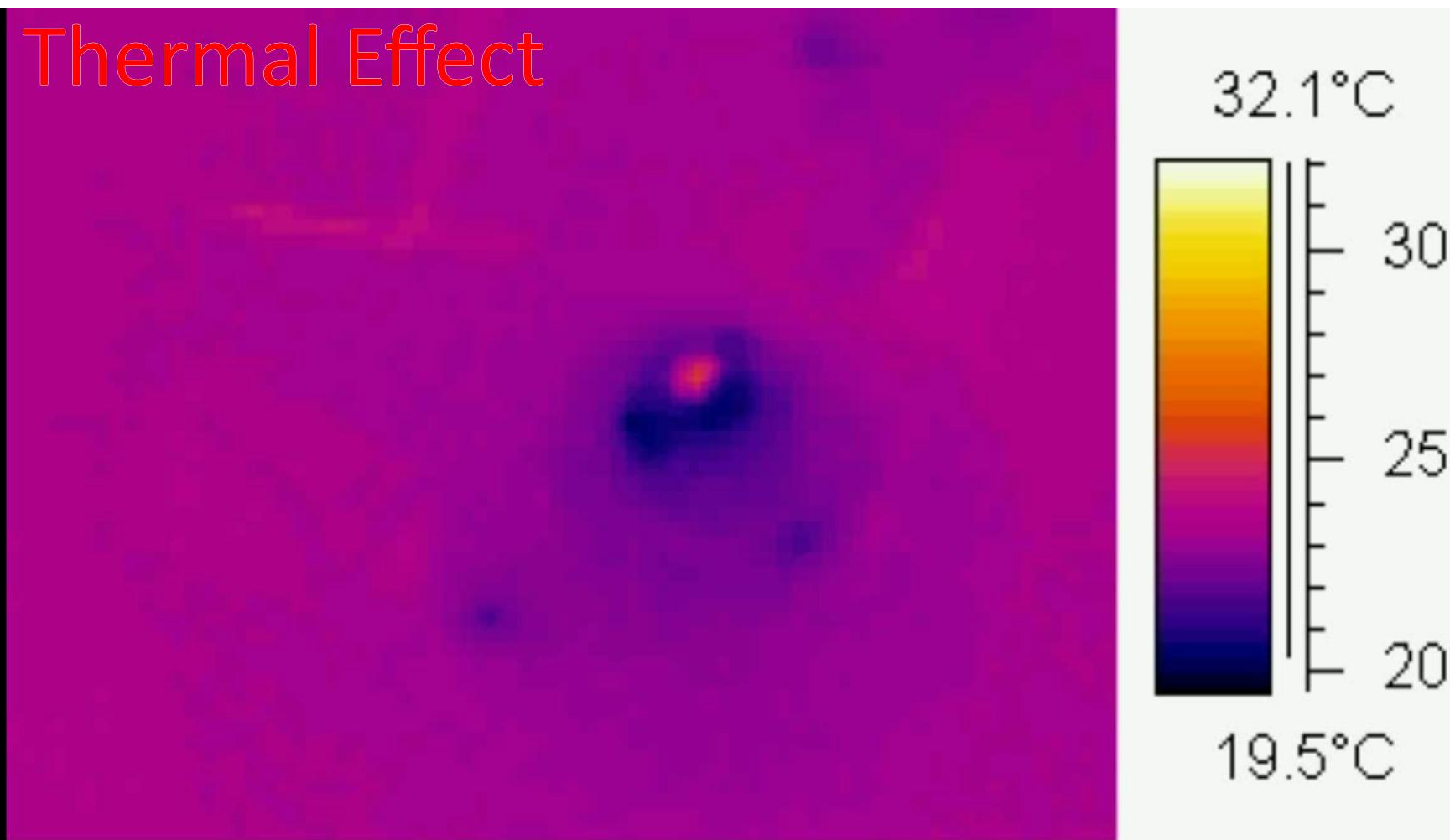
Timing
23.5 – 24.5 s

1st Tracking Test



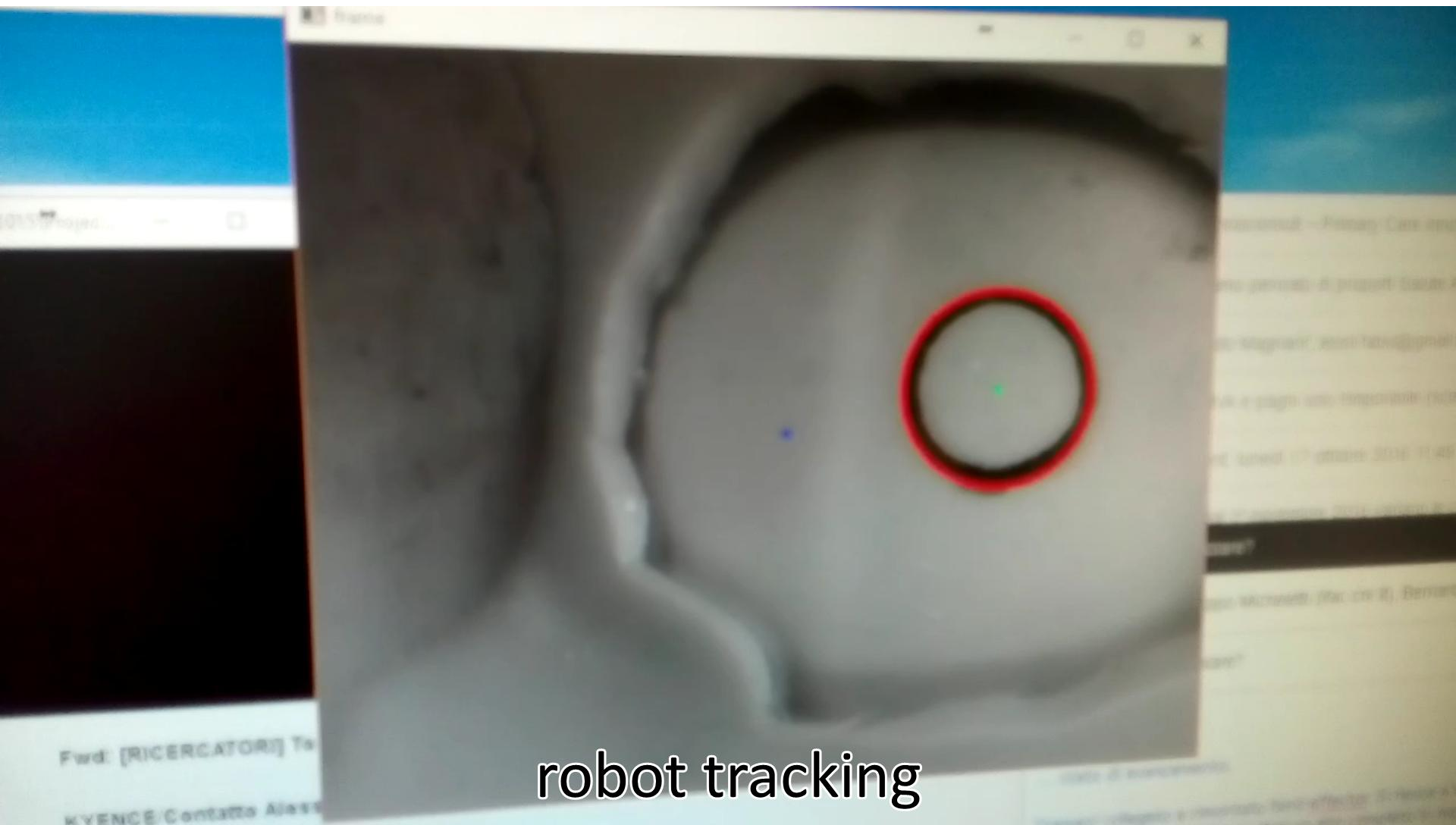
Timing
24.5 – 25.5 s

Thermal Effect



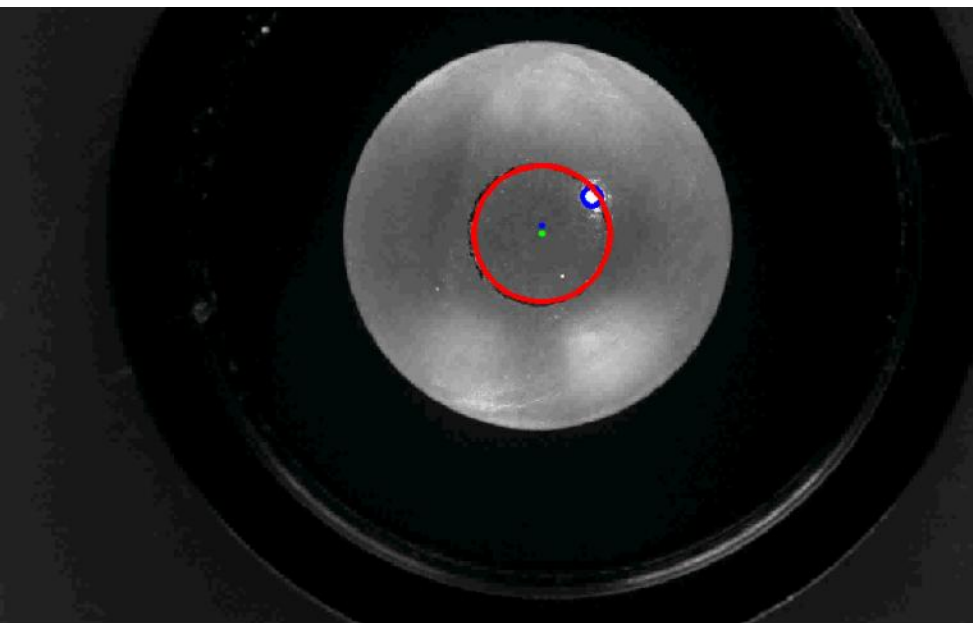
Thermal effect video

Timing
25.5 – 50.5 s



robot tracking

Timing
50 s – 1.04 min



Laser Translation
 COM Port: Vel
 COM10 620 Twd Cent Twd Edge STOP

Laser Rotation
 COM Port: Vel
 COM11 10 UP DOWN STOP

Laser Adjustment
 Thr adj [pix]
 5 ☒ Enable Adjust Laser position

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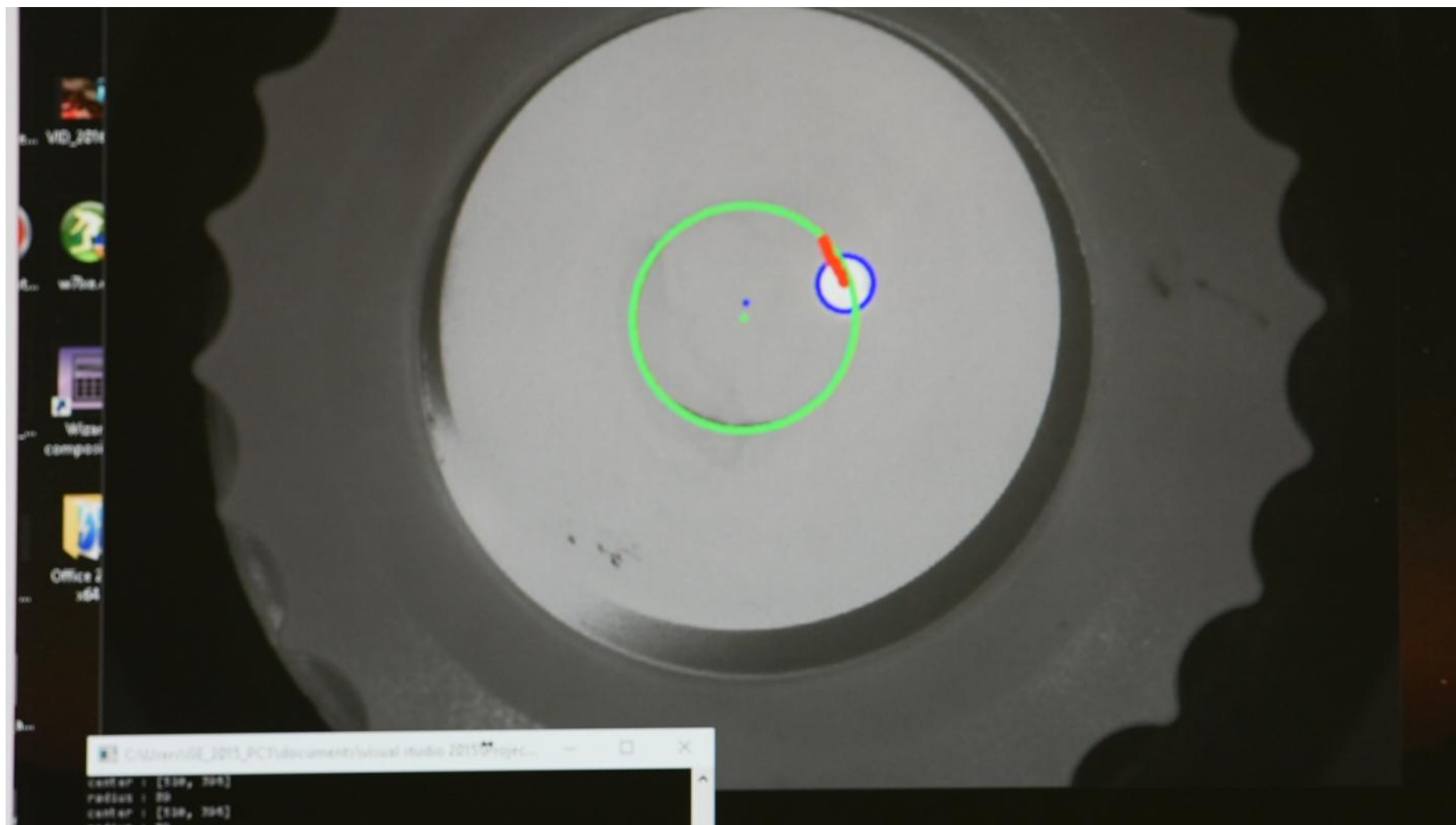


Simultaneous videos.

Upside: video from the sw

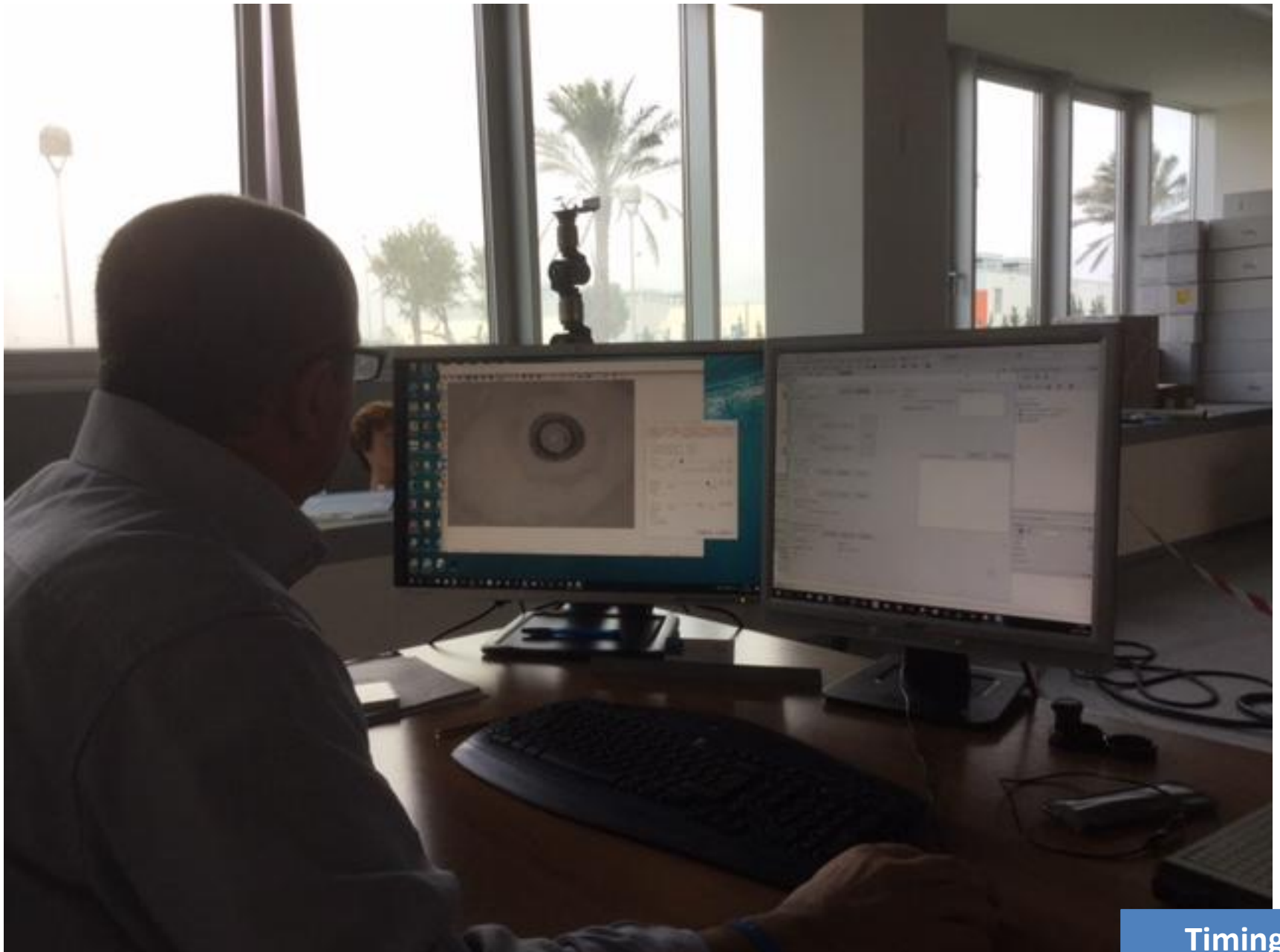
Downside: video from the hardware

Timing
1.04 – 3 min



Last tracking video

Timing
3 – 6.17 min



SW platform with Fabio Leoni (Fastenica) at work

Timing
6.17 – 6.21 min



The hardware at a glance

Timing
6.21 – 6.24 min

The research leading to these results has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 601116 – Echord ++



Timing
6.24– 6.27 min