LA - ROSES
Laser Assisted Robotic Surgery of the anterior Eye Segment

Story Board

European Clearing House for Open Robotics Development Plus Plus

LA - ROSES
Laser Assisted Robotic Surgery of the anterior Eye Segment

The Team:

Ekymed Srl
Fastenica Srl
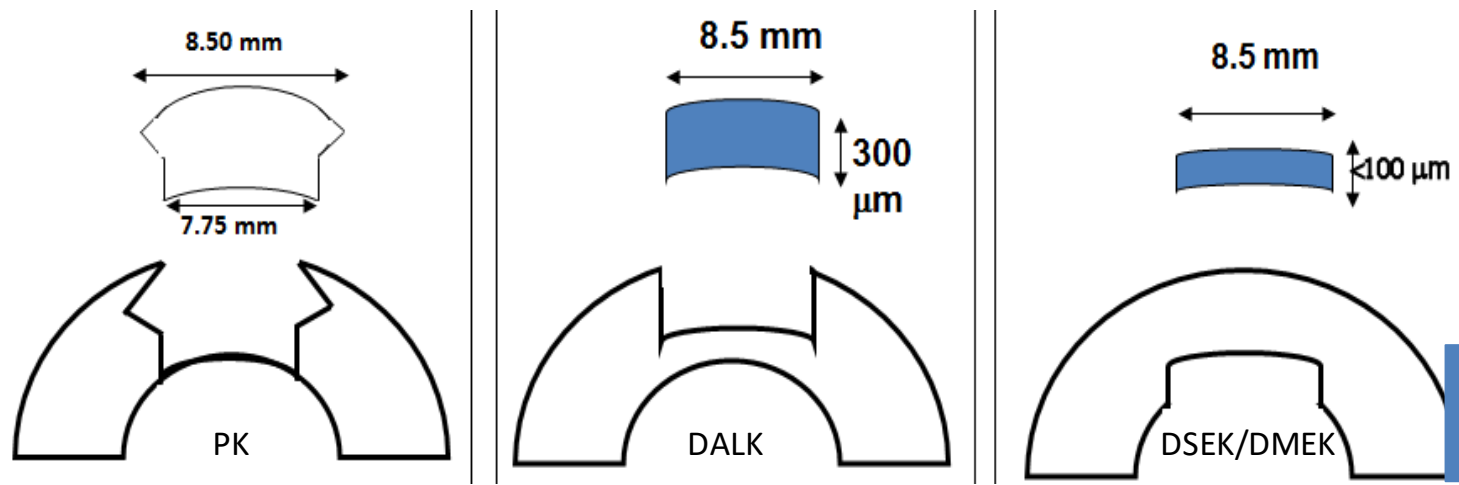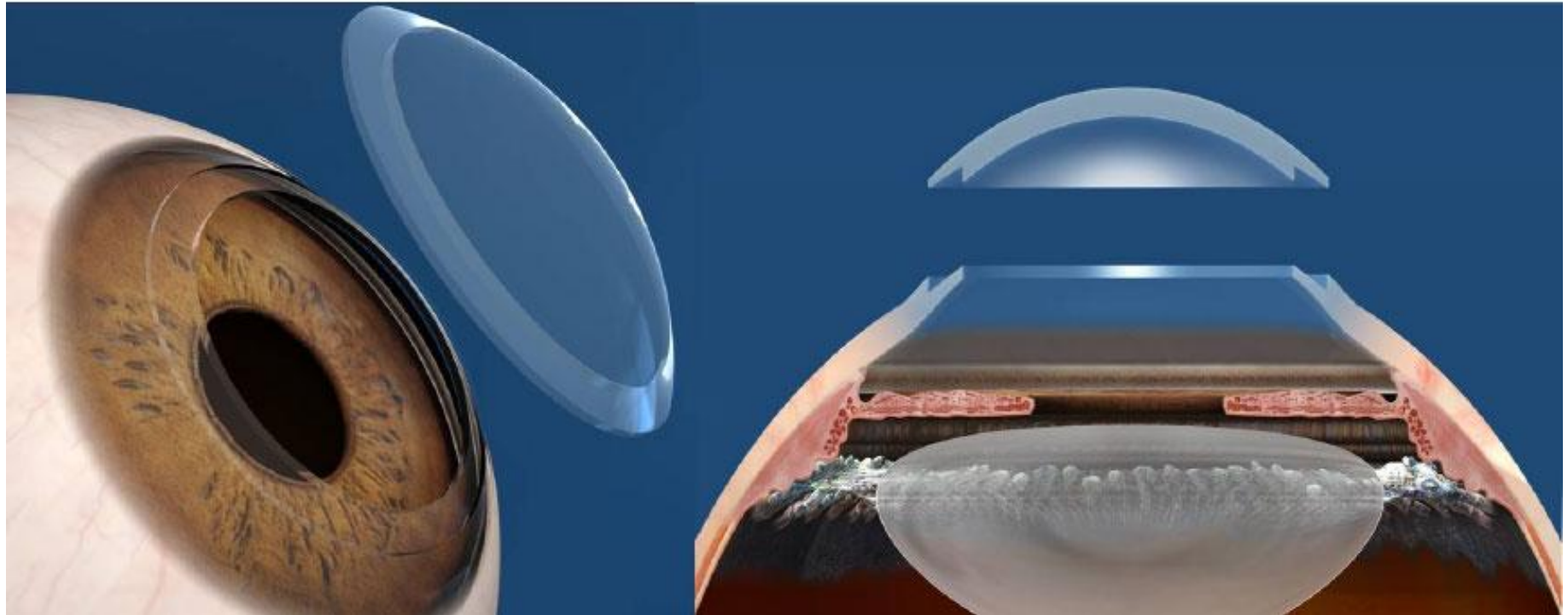*IFAC - CNR*

**Timing
2.5 - 5 s**

Cornea transplantation

PK

8.50 mm

7.75 mm

DALK

8.5 mm

300 μm

DSEK/DMEK

8.5 mm

<100 μm

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. <u>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</u>
- implement <u>a revised end-effector</u> 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
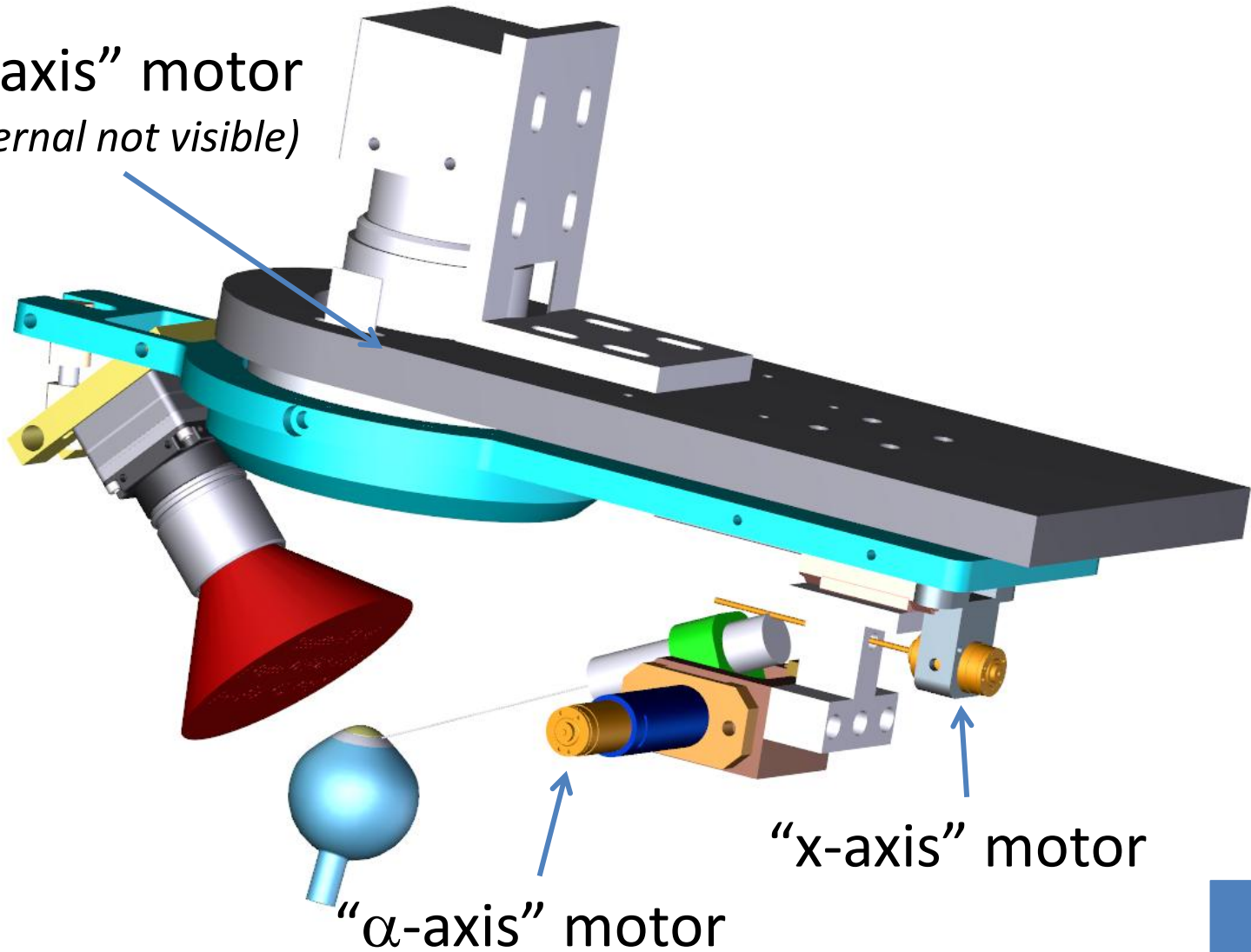
End-effector design 1ˢᵗ version

"z-axis" motor
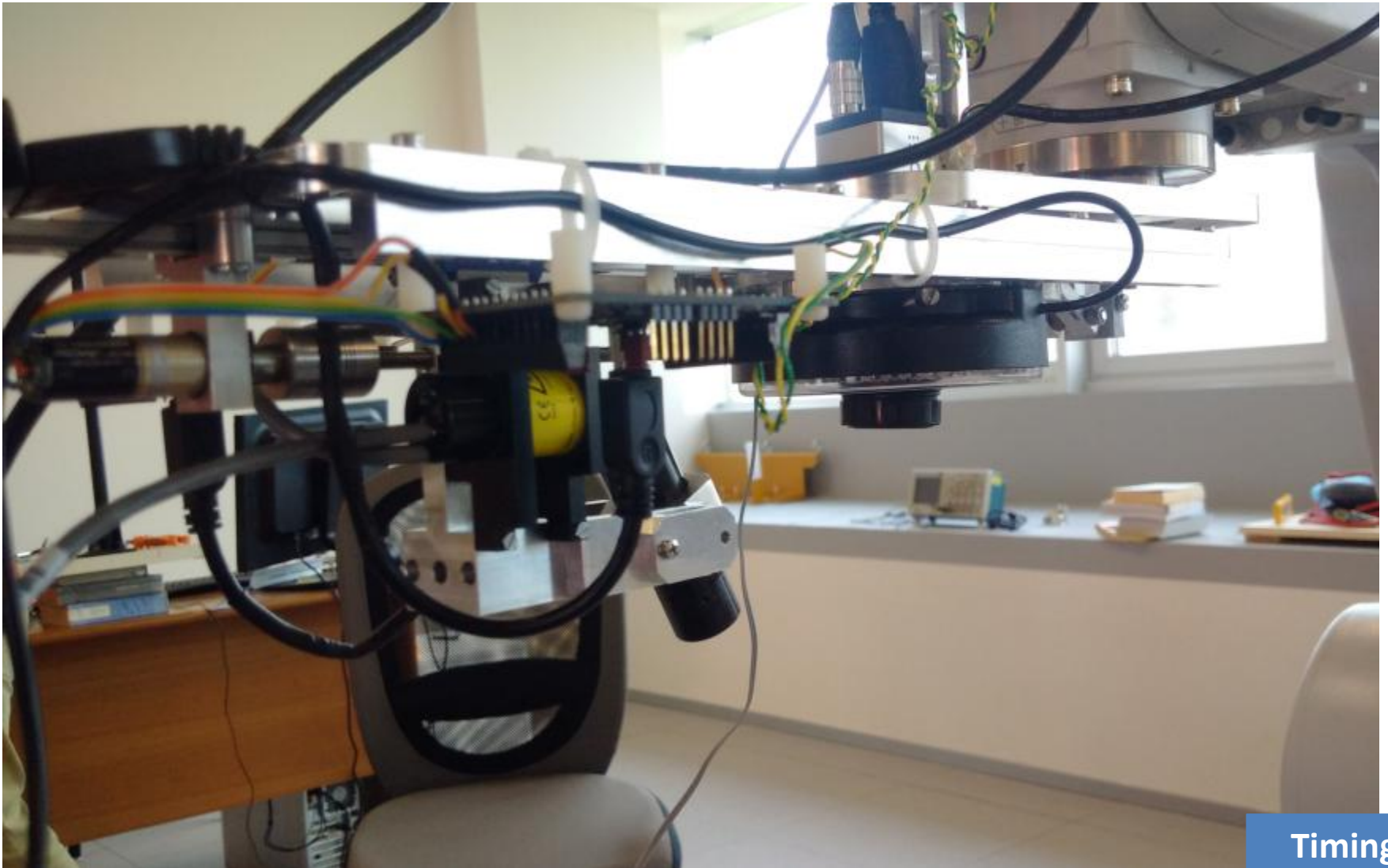*(internal not visible)*
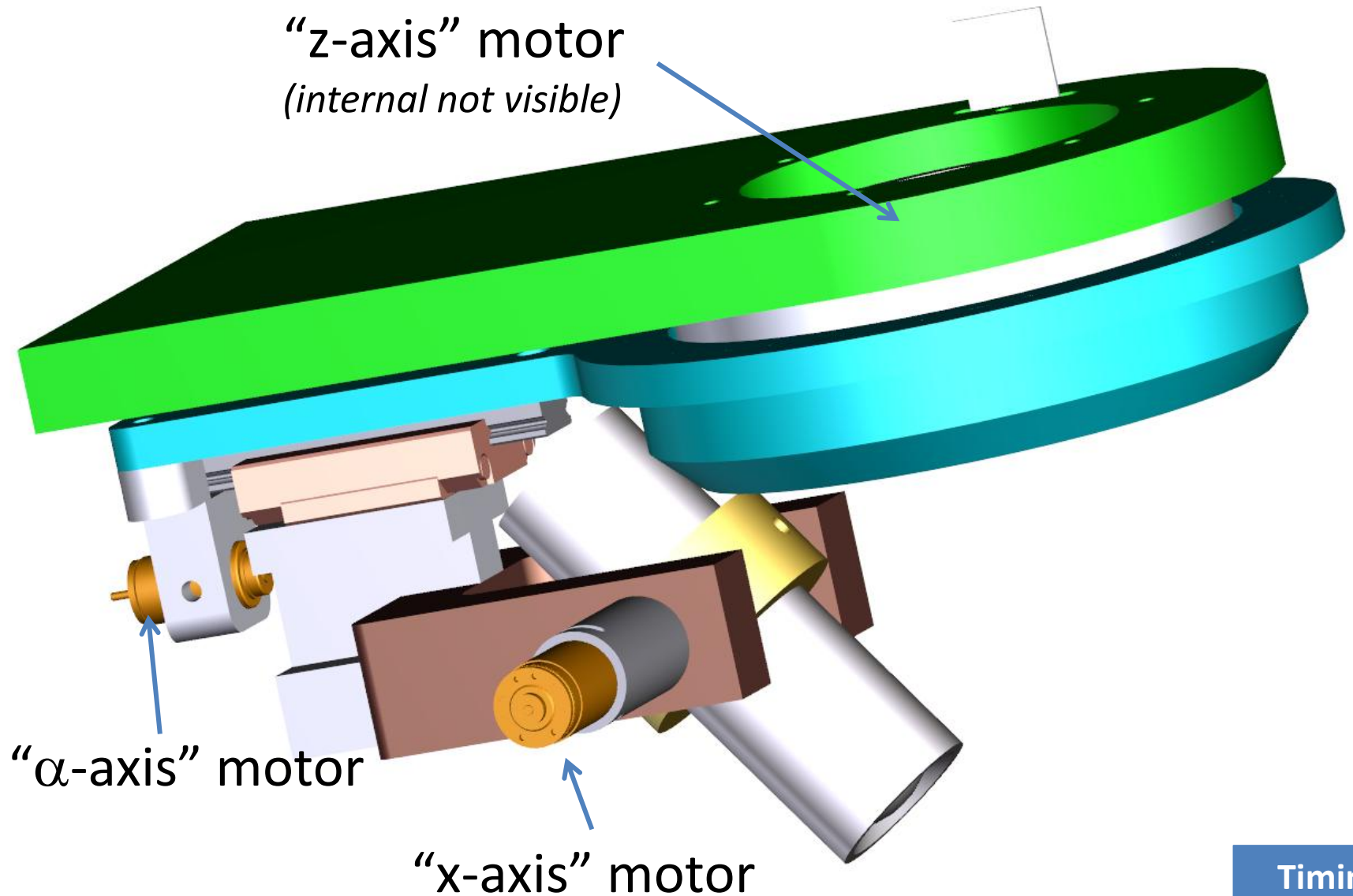
"α-axis" motor

"x-axis" motor

End-effector design 2ⁿᵈ version

"z-axis" motor
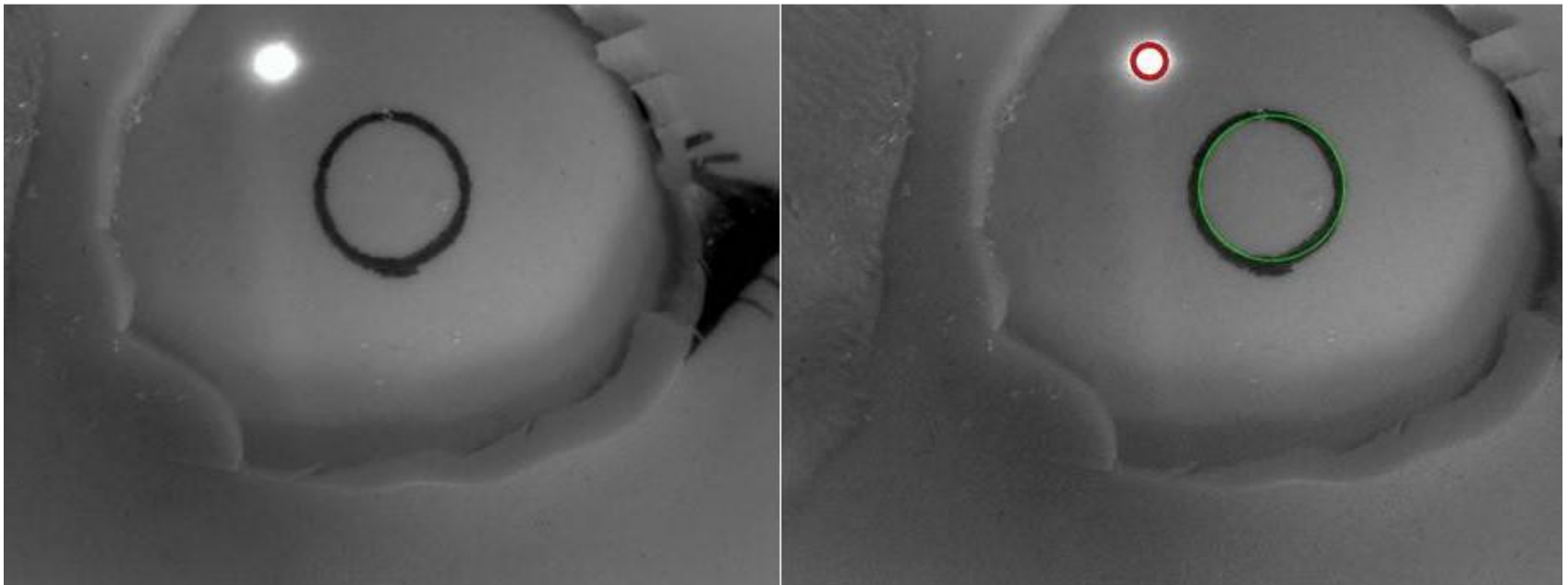*(internal not visible)*

"α-axis" motor

"x-axis" motor

Timing
15.5 – 17.5 s

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

Timing
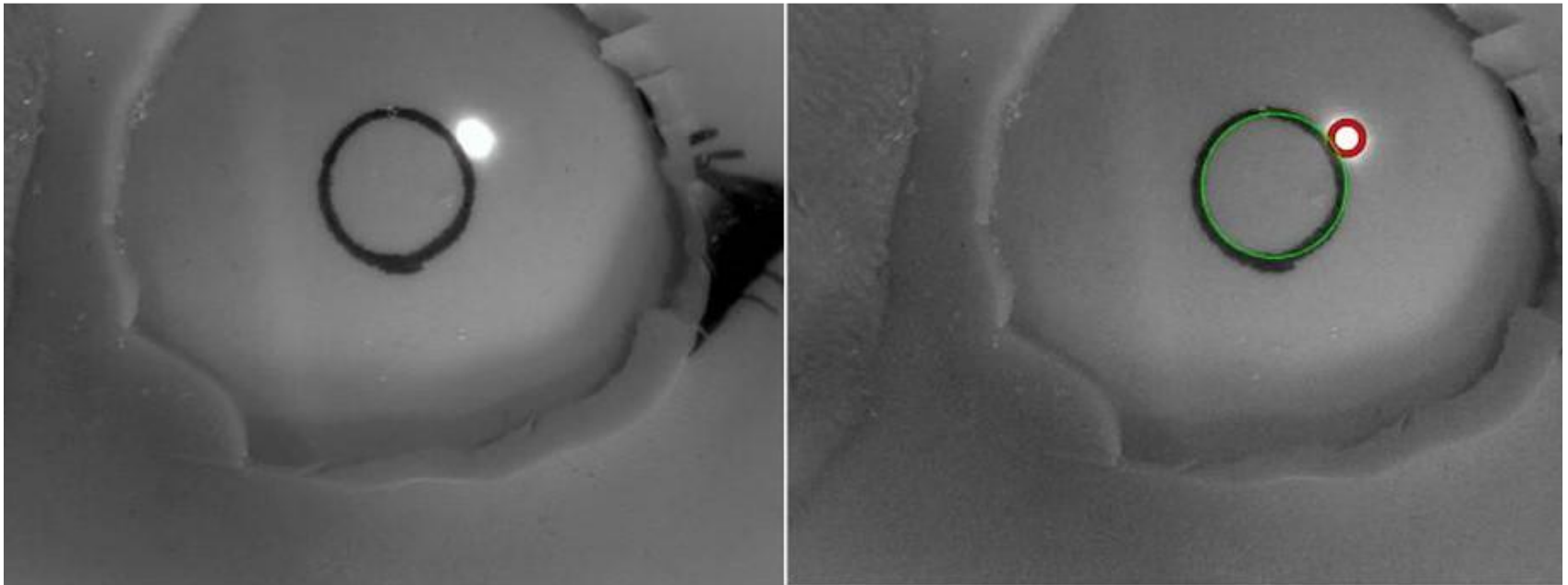**17.5 – 19.5 s**

1st Tracking Test

1st Tracking Test

1st Tracking Test

1st Tracking Test

1st Tracking Test

1ˢᵗ Tracking Test
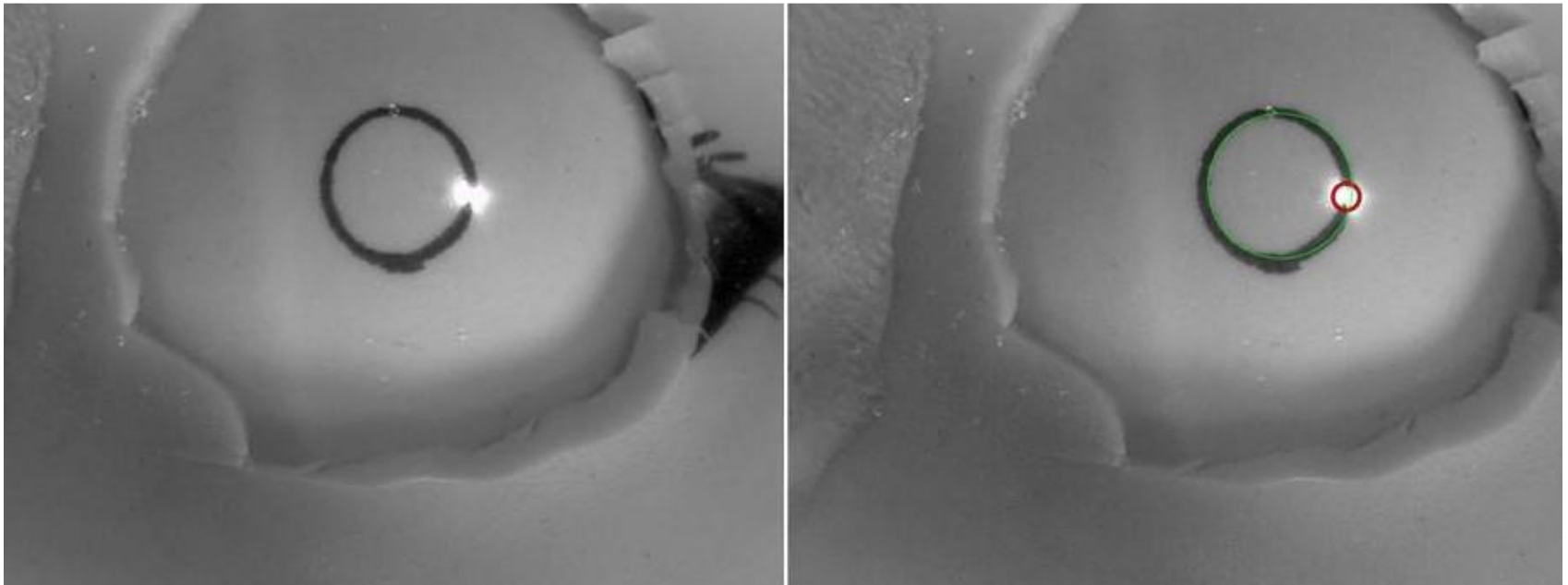
Thermal Effect

32.1°C

30

25

20

19.5°C
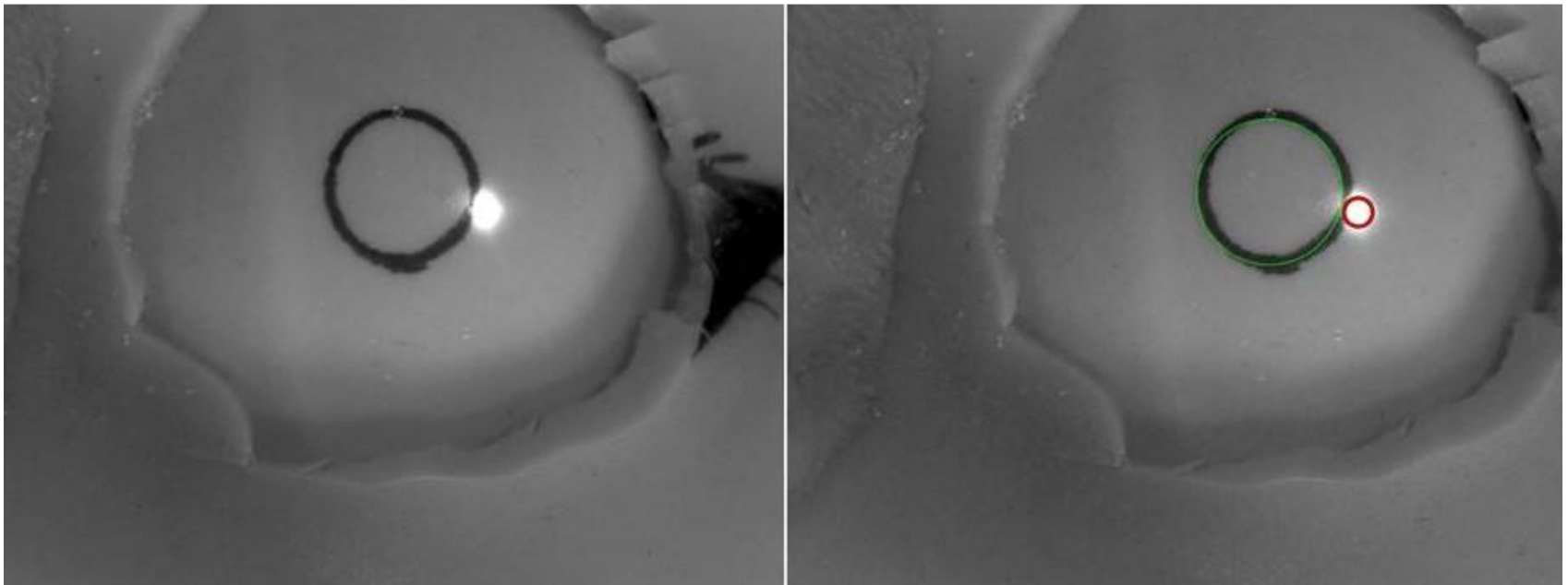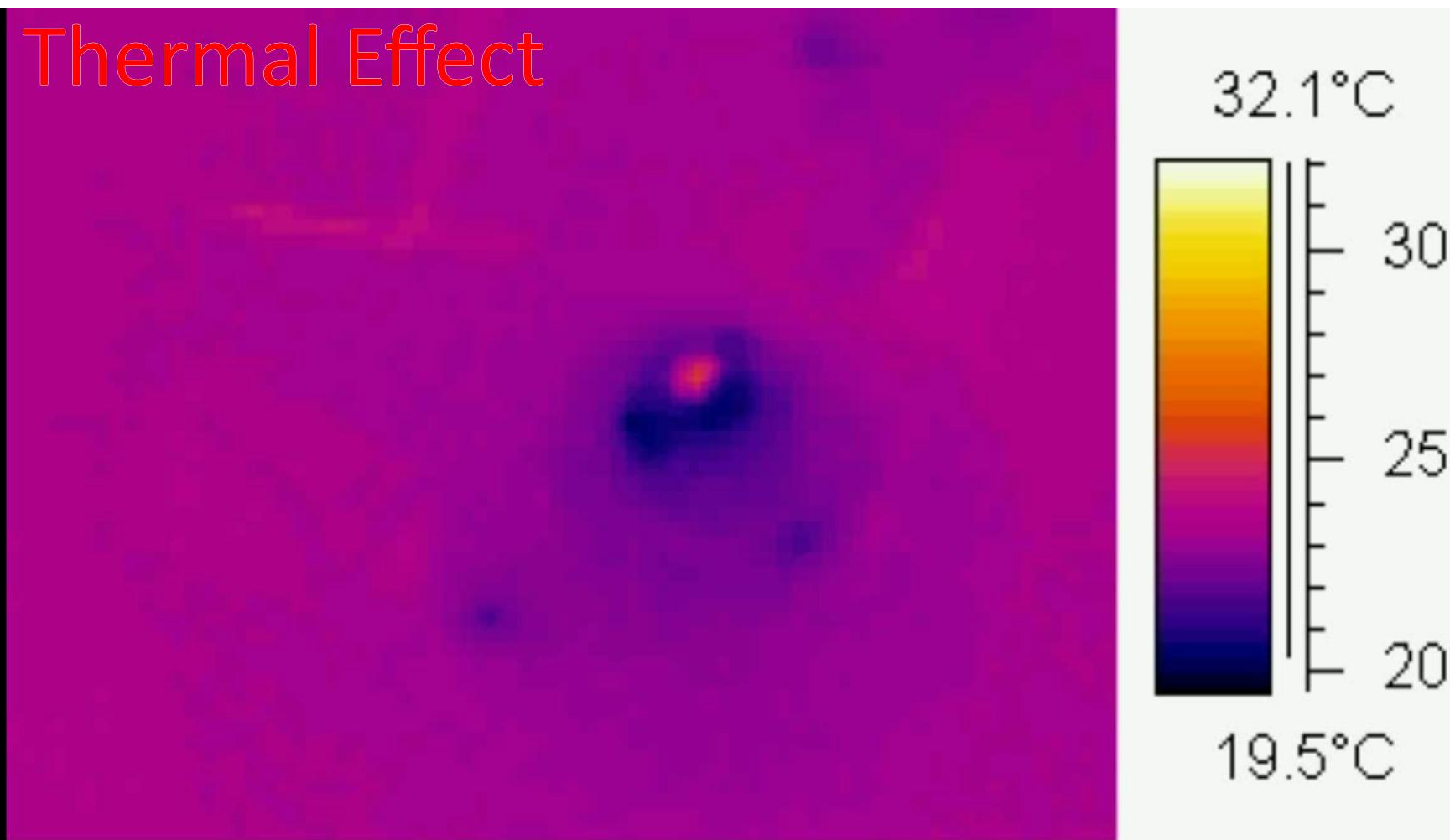
Thermal effect video

Timing
25.5 – 50.5 s

robot tracking
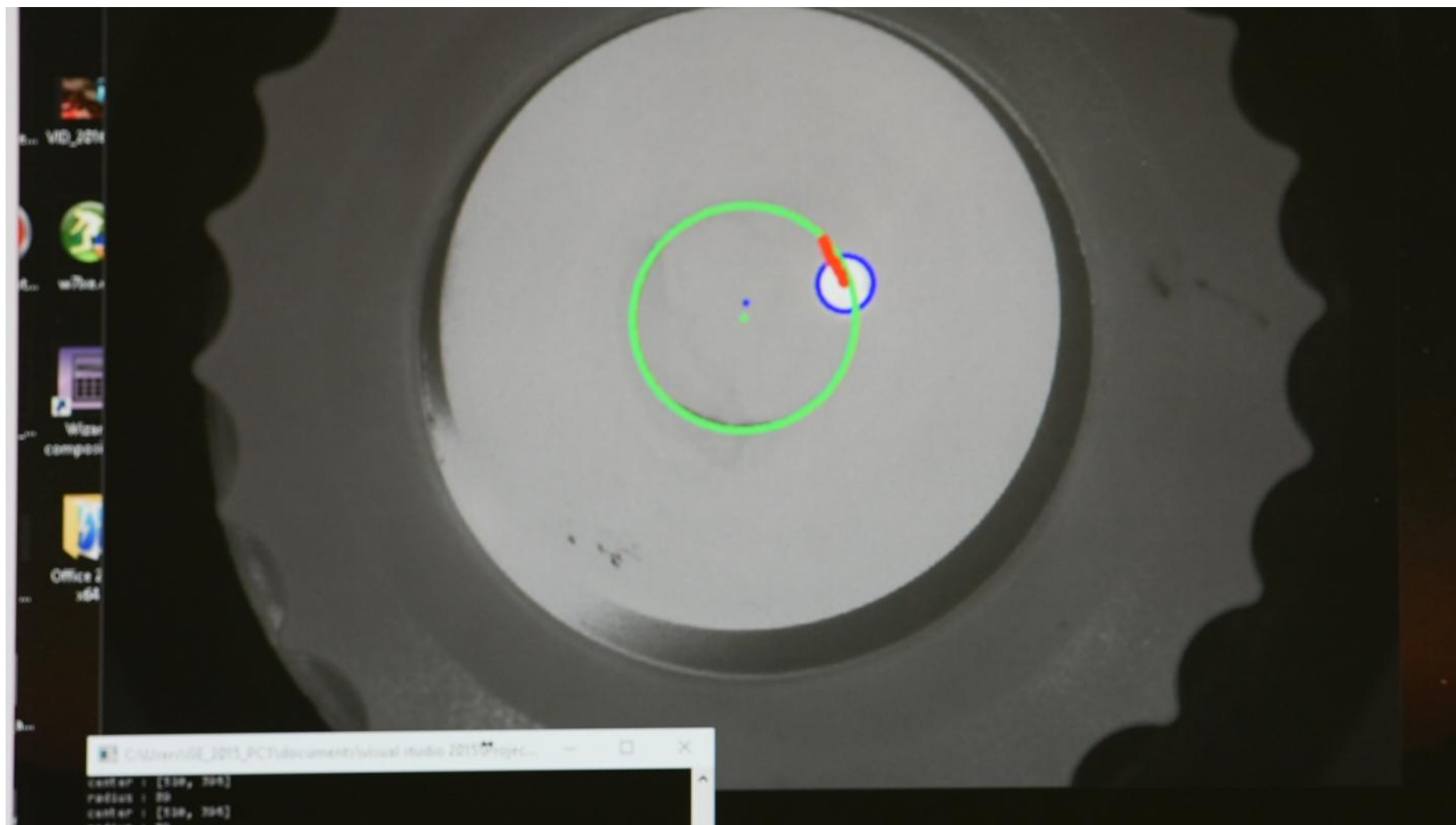
Simultaneous videos.
Upside: video from the sw
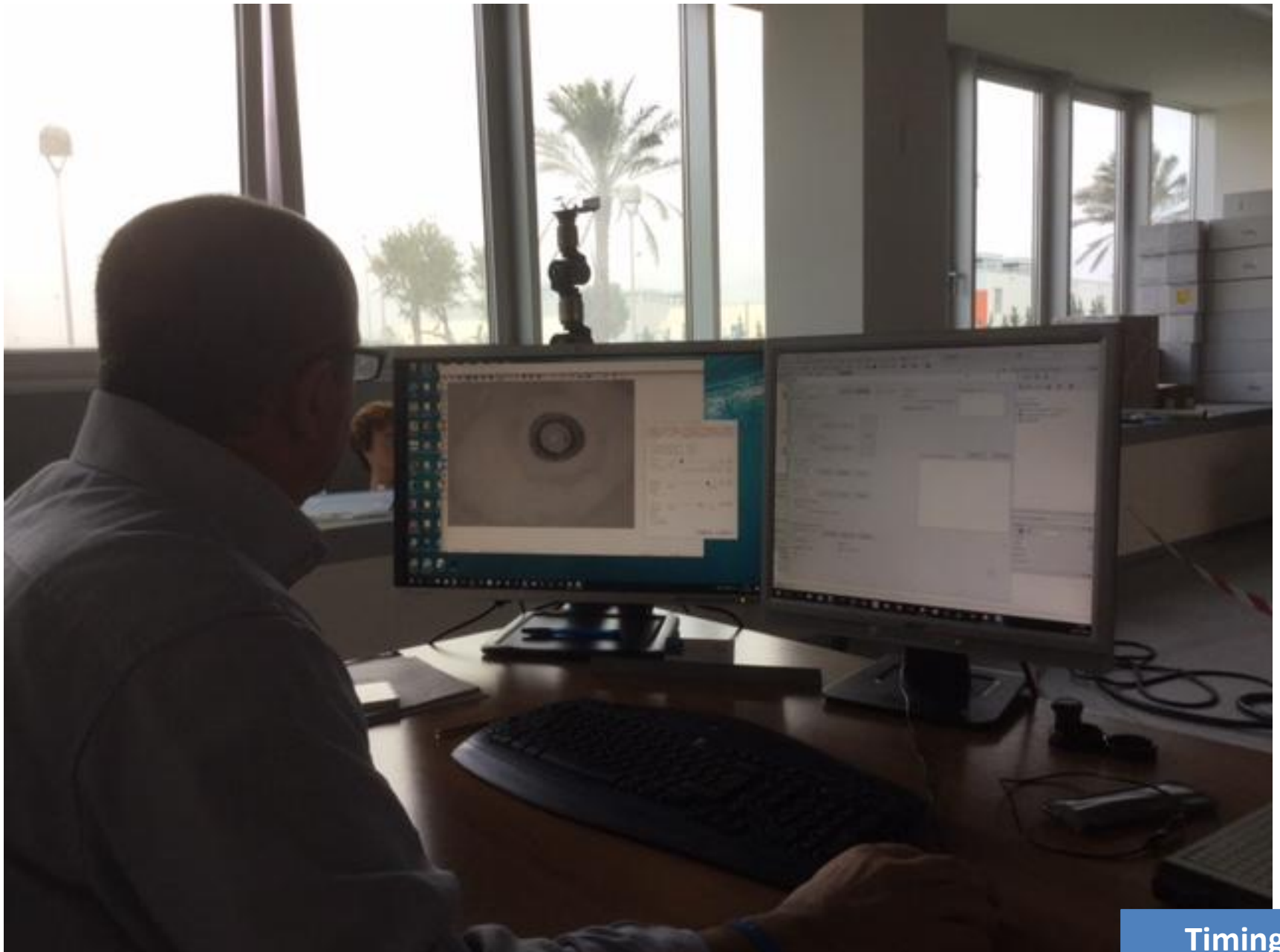Downside: video from the hardware

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

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