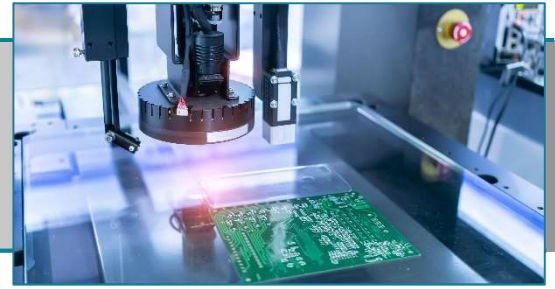


## TECHNOLOGY OFFER

### 3D vision measurement metrological tool to calibrate micro-robots

Keywords: robotics / calibration / metrology



#### CONTEXT

Today's micro-robots with several degrees of freedom make it possible to perform complex tasks at micro and nanometric scales.

These robotic solutions offer reliability in the repeatability of the measurement, but they are rarely precise and accurate because it is complex to calibrate these robots, apart from with an interferometer (but then the calibration is on a single axis, it there is no lateral movement tracking and the cost is expensive).

#### DESCRIPTION & DEVELOPPEMENT

The invention is a metrological tool (test charts containing positioning information similar to a QR code) for calibrating micro-robots according to 6 degrees of freedom:

- Dimensional characterization,
- Characterization of displacement and position,
- Alignment characterization for assembly,
- Resolution, repeatability, accuracy

The tool has been successfully validated by microscopy. The software is fully operational for 3 degrees of freedom, namely X, Y and Theta (rotation in the plane). At this stage, the proposed solution adapts to any configuration without placing any particular constraint on the way in which the image of the test chart is obtained (type of camera, magnification, measurement scale). In this area, it operates relatively universally.

The extension of this operational solution towards the other degrees of freedom is explored, to make 3D (Z included), even 5 or 6 degrees of freedom, with covered applications which will be more strongly constrained in cost and in depth.

#### COMPETITIVE ADVANTAGES

- Nanometric measurement according to 6 degrees of freedom for parallel robotic systems
- Possibility of being inserted during design with great flexibility or added later
- Potential possibility of performing analysis and calibration of metrological measuring machines
- The target tool provides a robust measurement of the position despite high occultation rates



#### Market & Application

- ❖ Robotics with characterization of actuators and control of actual movements of the end effector
- ❖ Biomedical imaging systems
- ❖ Microscopy (biomedical, materials)
- ❖ Micro / Nano 3D printing
- ❖ Optical fiber alignment (with adaptations)



#### Stage of development

TRL 6



#### Research Team

FEMTO-ST Institute



#### Intellectual property

Code deposit in progress



#### Partnership

Technology transfer  
Co-maturation

#### CONTACT-US

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