



EUCALL - WP6 – HIREP

Milestone 6.3: M6 / 31.03.2016

„ Specification of the UHV microscope “

The vacuum compatible microscope will be developed to read the fiducial marks on the sample frame and identify the focal position. Identifying the positions of these marks in the reference frame of the facility will allow to absolutely position any of the targets into the focus of the facility. A vacuum-compatible microscope for this use will be developed. The specifications of the microscope will be the following:

- The microscope should be vacuum compatible and allow use in an UHV environment (pressure: $< 10^{-6}$ mbar).
- The microscope should be mounted on a CF-flange for easy exchange. The design should be as compact as possible.
- For fine positioning the microscope can be positioned as a single unit (optics and CCD camera) with an accuracy of better than $1 \mu\text{m}$ and a travel range of $> 2 \text{ mm}$ in x,y,z direction.
- The CCD camera should be placed outside vacuum at atmospheric pressure, the microscope objective will be placed in vacuum.
- Separation between vacuum and atmospheric pressure will be achieved by placing a vacuum window in the infinitely corrected optical beam path.
- The microscope should be based on on-axis viewing in order to avoid parallax errors.
- As an option it should be possible to exchange the microscope objective if required.
- The field of view should be more than $0.3 \times 0.3 \text{ mm}$.
- An optical resolution of better than $1 \mu\text{m}$ is required aiming at sub-micrometer positioning accuracy.
- The depth of field should be limited to less than $10 \mu\text{m}$ as this will be used for alignment of the target in the beam direction.
- For fluorescence microscopy the design should allow to place different filters into the beam path. The system should be compatible with different illumination sources.

