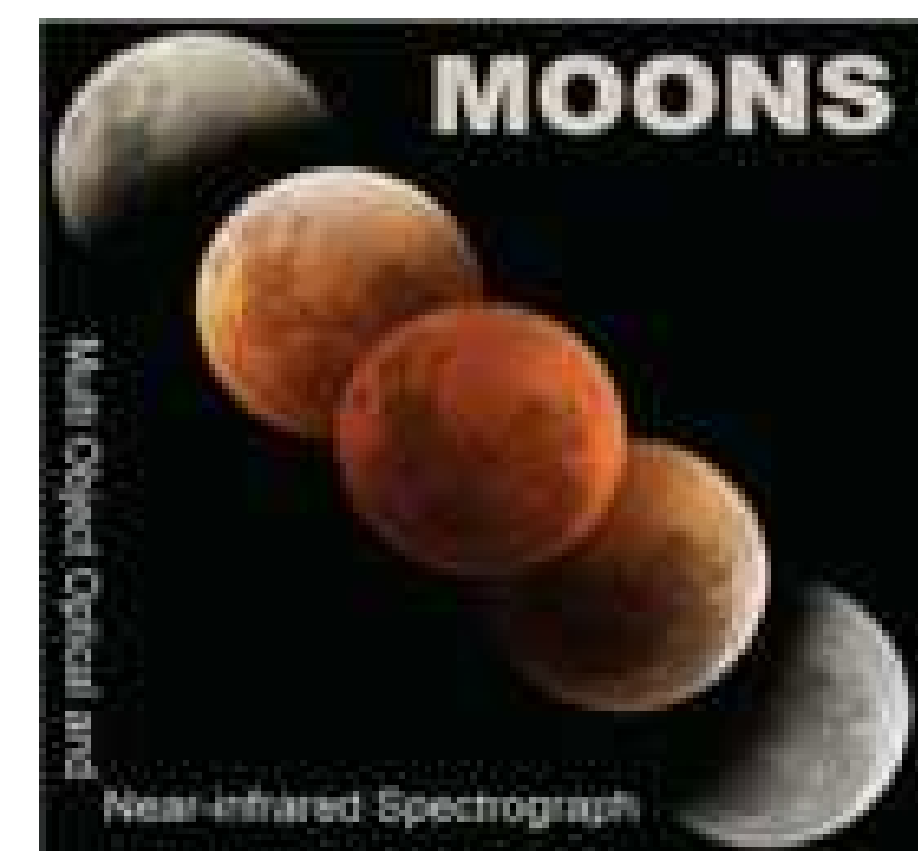# Implementation and performance of the Metrology system for MOONS

H.Drass [a], L.Vanzi [a], M.Torres-Torriti [a], R.Dünner [a], T.Shen [a], F. Belmar [a], L.Dauvin [a], T.Staig [a], J. Antognini [a], M.Flores [a], Y.Luco [a], C.Béchet [a], D. Boettger [a], S.Beard [b], D.Montgomery [b], A.Cabral [c], M.Hayati [c], M.Abreu [c], P.Rees [b], M.Cirasuolo [d], W.Taylor [b], and A.Fairley [b]

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INTRODUCTION

The Multi-Object Optical and Near-infrared Spectrograph (MOONS) will cover the VLT's field of view with 1000 fibers. The fibers will be mounted on two-arm robots to allow a homogeneous coverage of the 500 square arcmin field of view. To accurately and fast determine the position of the 1000 fibres a metrology system has been designed.
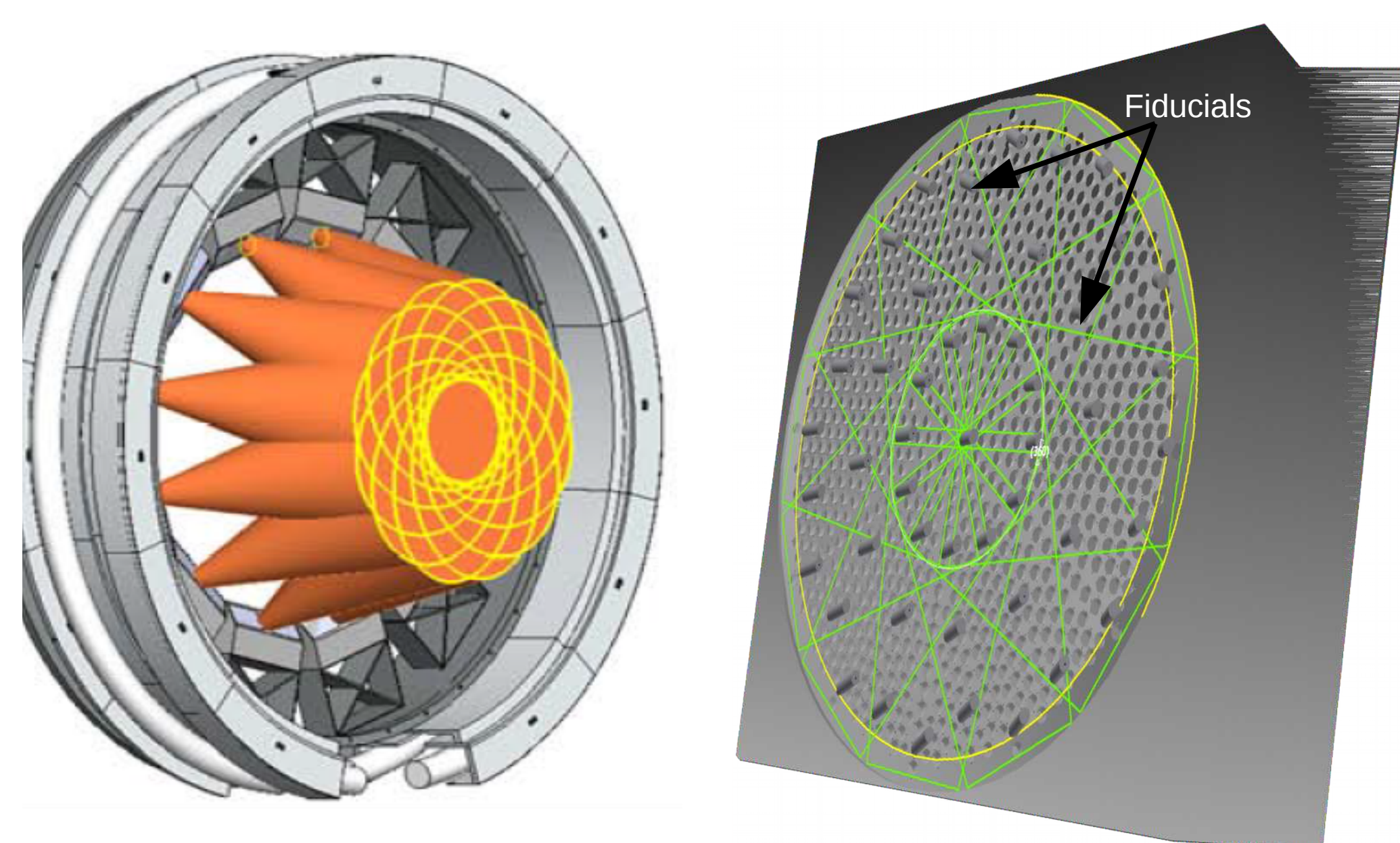
Fig. 1 Metrology system configuration. Left: 12 cameras in circular configuration with the observing direction marked in orange. Right: Observed fiber positioner support plate with fiducials and camera's fields of view marked in green.
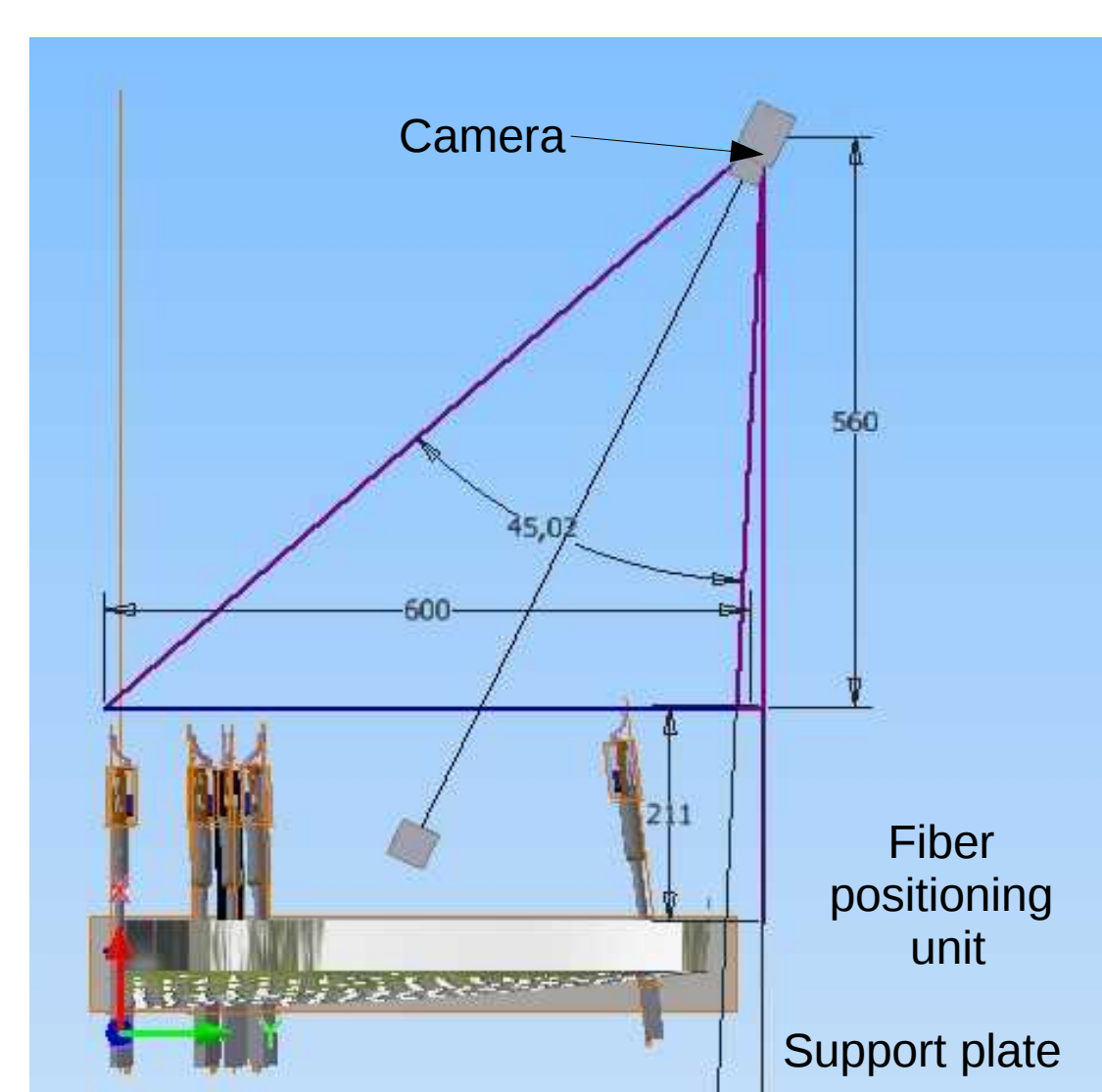
Fig. 2 Lateral view of the metrology system. Fiber positioner unit (FPU). Cluster of FPUs.

METHODS

A combination of 12 cameras and 24 light with adjustable brightness provide ideally illuminated high-resolution images.

IDS UI-3590CP, 18M pixel, Resolution 8.3 px/mm

Metz mecalight LED-480

Fig. 3: From left to right: Metrology camera, Beckhoff light control, Metz metrology light

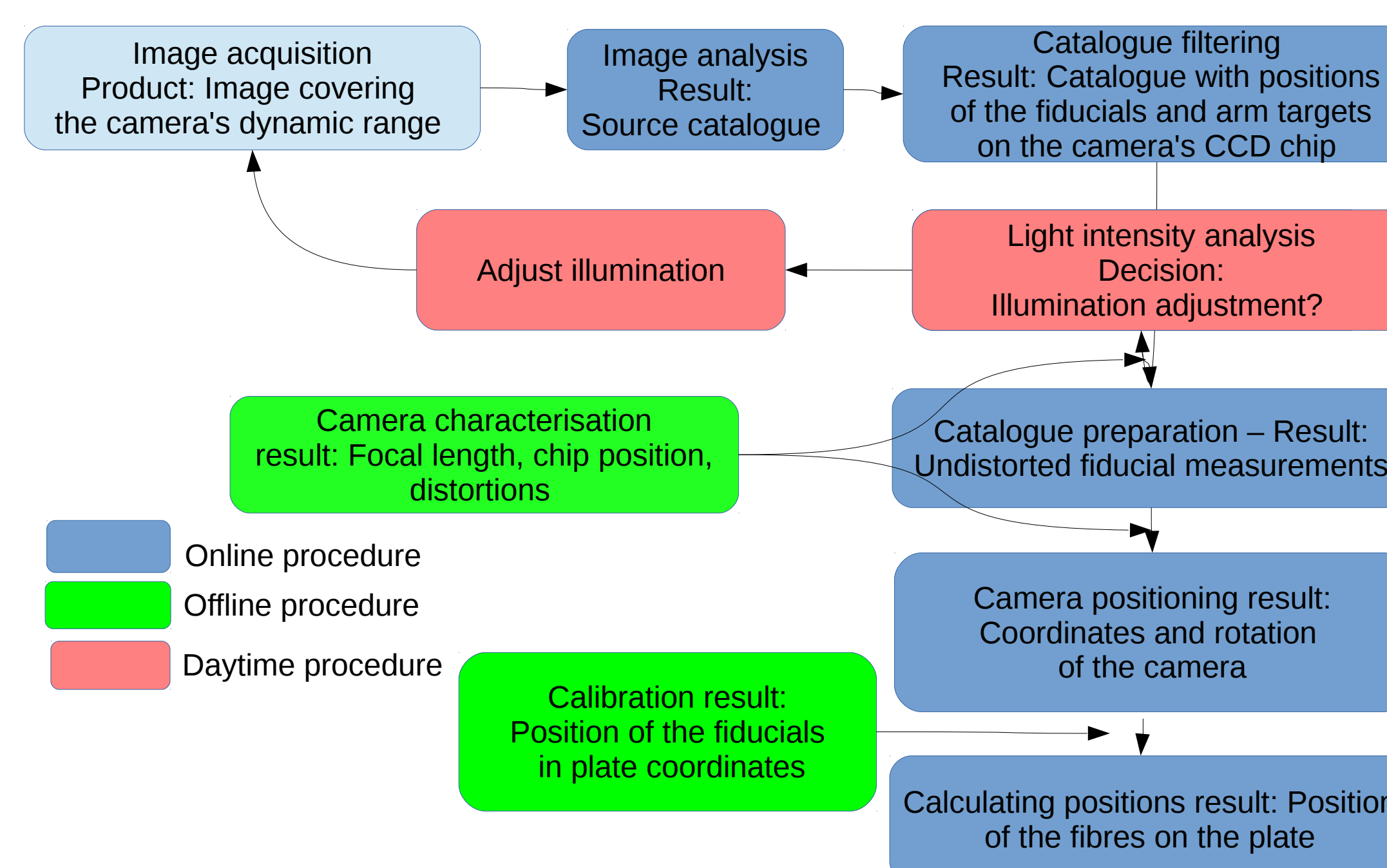A flexible pipeline based on VLT standards is used to process the images.

Fig. 4 Metrology Software pipeline

RESULTS

The position accuracy was determined to ~5 μm in the central region of the images. Including the outer regions the overall positioning accuracy is ~25 μm.
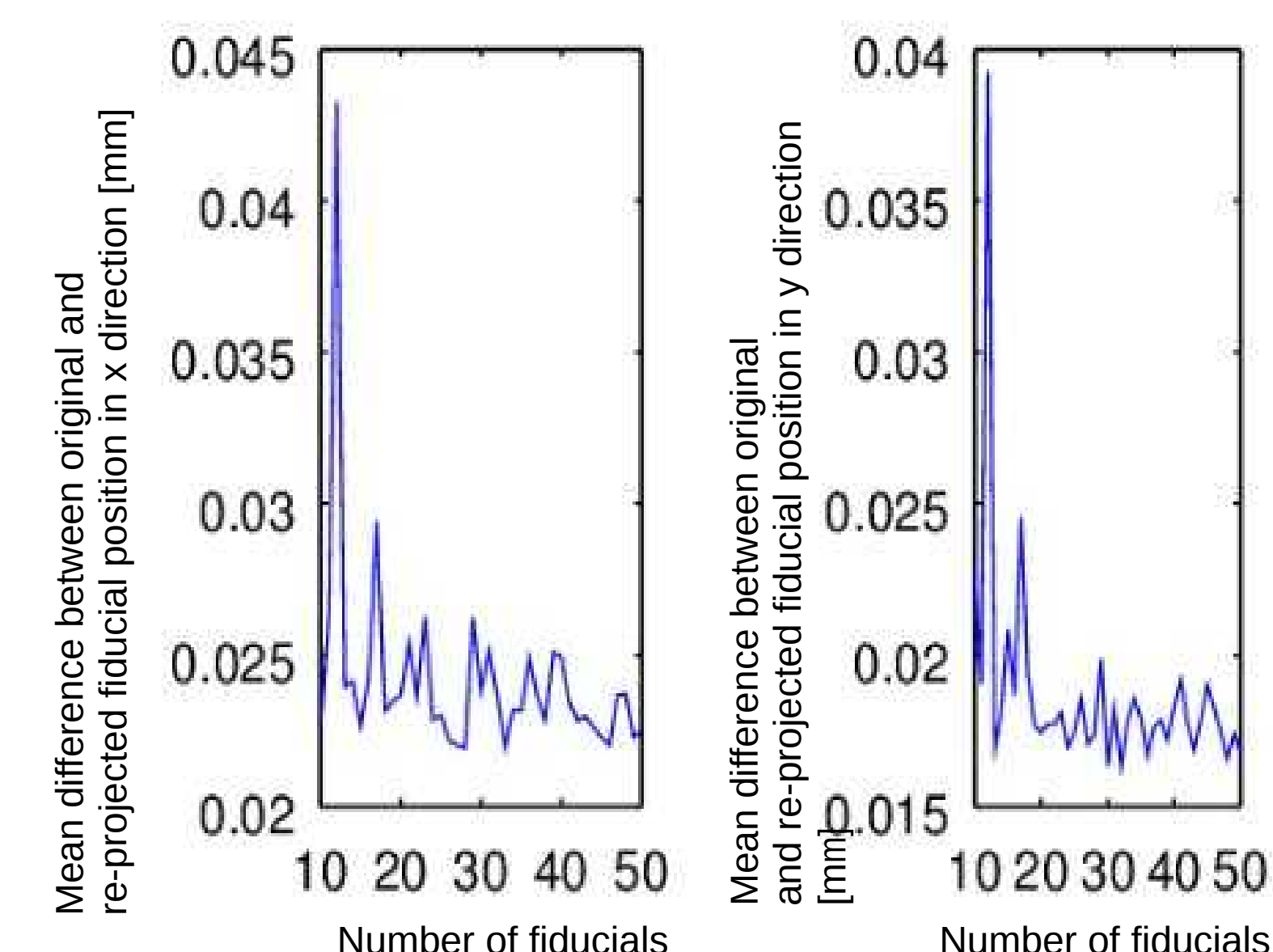
Fig. 5 Overall performance: Fiducial number simulation

CONCLUSIONS

1. **Results in the center of the image are excellent.**
2. **Further hardware improvement are on the way.**
3. **Integration into the VLT software environment is ongoing.**

The MOONS metrology system is fully set up with a working prototype. By using upcoming hardware and improving the calibration it is expected to fulfill the accuracy requirement over the complete field of view for all metrology cameras.

REFERENCES

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[2] Drass, H, Vanzi, L, Shen, T, Torres, M, Dünner, R, Belmar, F, Staig, T, Antognini, J, MOONS Metrology Status report Face-to-Face meeting (Firenze, May 2015).

[3] Torres-Torriti, M., Vanzi, L., Dünner, R., Belmar, F., Dauvin, L., Chen, T.-C., Cirasuolo, M., Taylor, W., Schnetler, H., Montgomery, D., Rees, P., and Cabral, A., Proc. SPIE 9147, 91478M (July 2014).